

Revision:

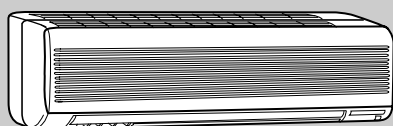
- MSZ-G20SV -E1 has been added.
- SPECIFICATION, PERFORMANCE CURVES and PARTS LIST have been added.
- Please void OB245 REVISED EDITION-A.

No. OB245
REVISED EDITION-B

SERVICE MANUAL

**Wireless type
Models**

MSZ-G09SV -E1 (WH)	▪	MUZ-G09SV -E1
MSZ-G09SV -E2 (WH)	▪	MUZ-G09SV -E2
MSZ-G12SV -E1 (WH)	▪	MUZ-G12SV -E1
MSZ-G12SV -E2 (WH)	▪	MUZ-G12SV -E2
MSZ-G20SV -E1 (WH)	▪	MUZ-G20SV -E1



MSZ-G20SV -E1



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1 TECHNICAL CHANGES

MSZ-G09SV -[E1]→MSZ-G09SV -[E2]

MSZ-G12SV -[E1]→MSZ-G12SV -[E2]

1. Remote controller has been changed.

MUZ-G09SV -[E1]→MUZ-G09SV -[E2]

MUZ-G12SV -[E1]→MUZ-G12SV -[E2]

1. Only model name has changed.

MSZ-G20SV -[E1]

New model

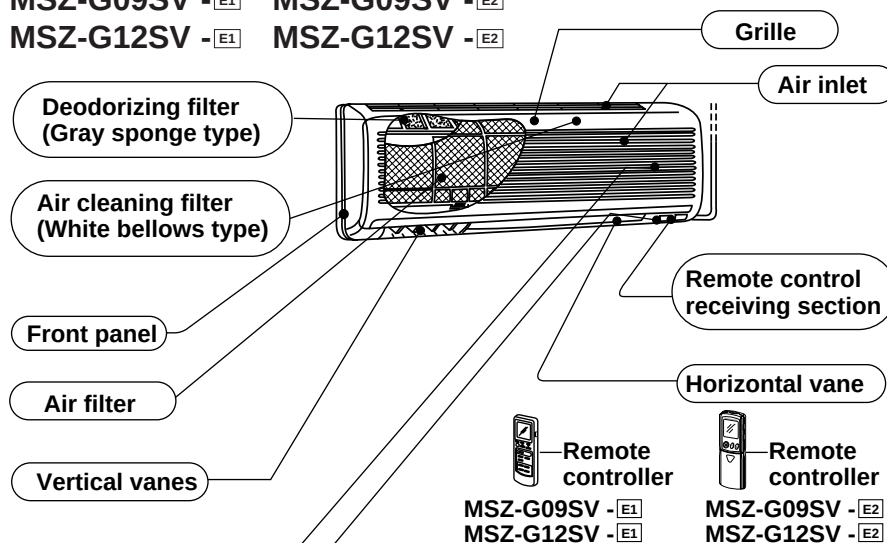
MUZ-G20SV -[E1]

New model

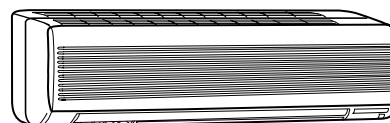
2 PART NAMES AND FUNCTIONS

INDOOR UNIT

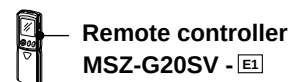
MSZ-G09SV -[E1] MSZ-G09SV -[E2]
MSZ-G12SV -[E1] MSZ-G12SV -[E2]



MSZ-G20SV -[E1]



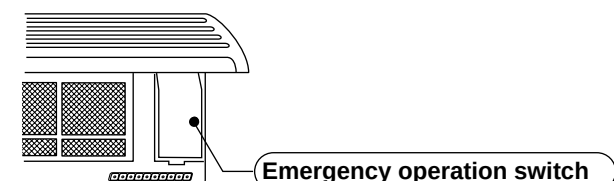
Deodorizing filter(gray sponge type) and air cleaning filter(white bellows type) of MSZ-G20SV -[E1] are optional parts.



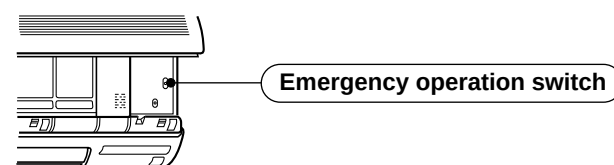
Operation section

(When the grille is opened)

MSZ-G09SV -[E1] MSZ-G09SV -[E2]
MSZ-G12SV -[E1] MSZ-G12SV -[E2]

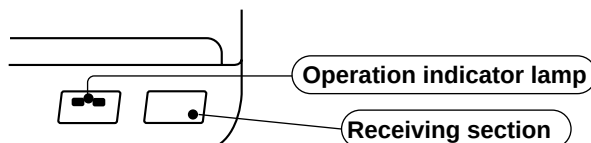


MSZ-G20SV -[E1]

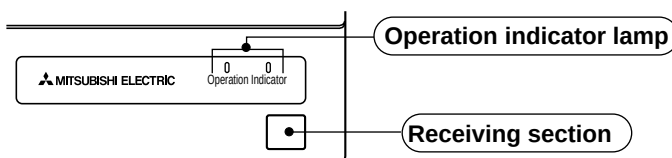


Display section

MSZ-G09SV -[E1] MSZ-G09SV -[E2]
MSZ-G12SV -[E1] MSZ-G12SV -[E2]



MSZ-G20SV -[E1]



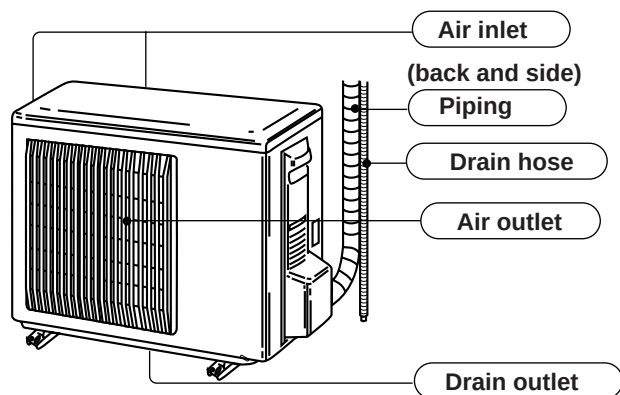
OUTDOOR UNIT

MUZ-G09SV - **E1**

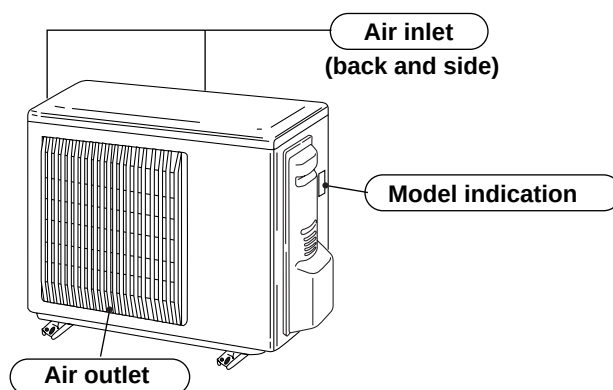
MUZ-G09SV - **E2**

MUZ-G12SV - **E1**

MUZ-G12SV - **E2**



MUZ-G20SV - **E1**



ACCESSORIES

INDOOR UNIT

		MSZ-G09SV - E1 MSZ-G09SV - E2 MSZ-G12SV - E1 MSZ-G12SV - E2	MSZ-G20SV - E1
①	Installation plate	1	1
②	Installation plate fixing screw 4 × 25 mm	5	7
③	Remote controller holder	1	1
④	Fixing screw for ③ 3.5 × 1.6 mm (Black)	2	2
⑤	Battery (AAA) for remote controller	2	2
⑥	Wireless remote controller	1	1
⑦	Felt tape (Used for left or left-rear piping)	1	1

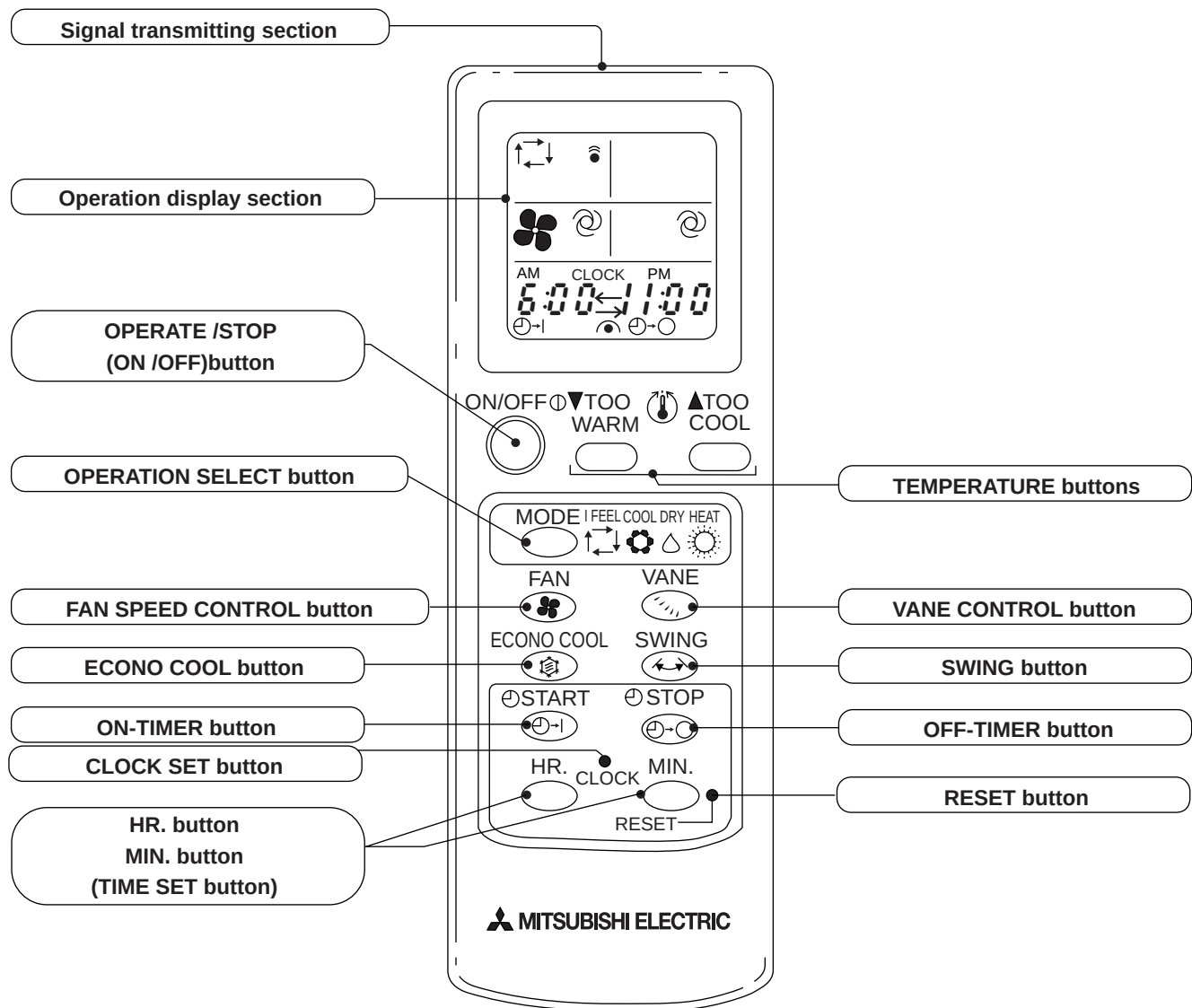
OUTDOOR UNIT

		MUZ-G20SV - E1
⑧	Drain socket	2
⑨	3-way drain socket	1
⑩	Relay pipe	1
⑪	Different-diameter pipe	1

REMOTE CONTROLLER

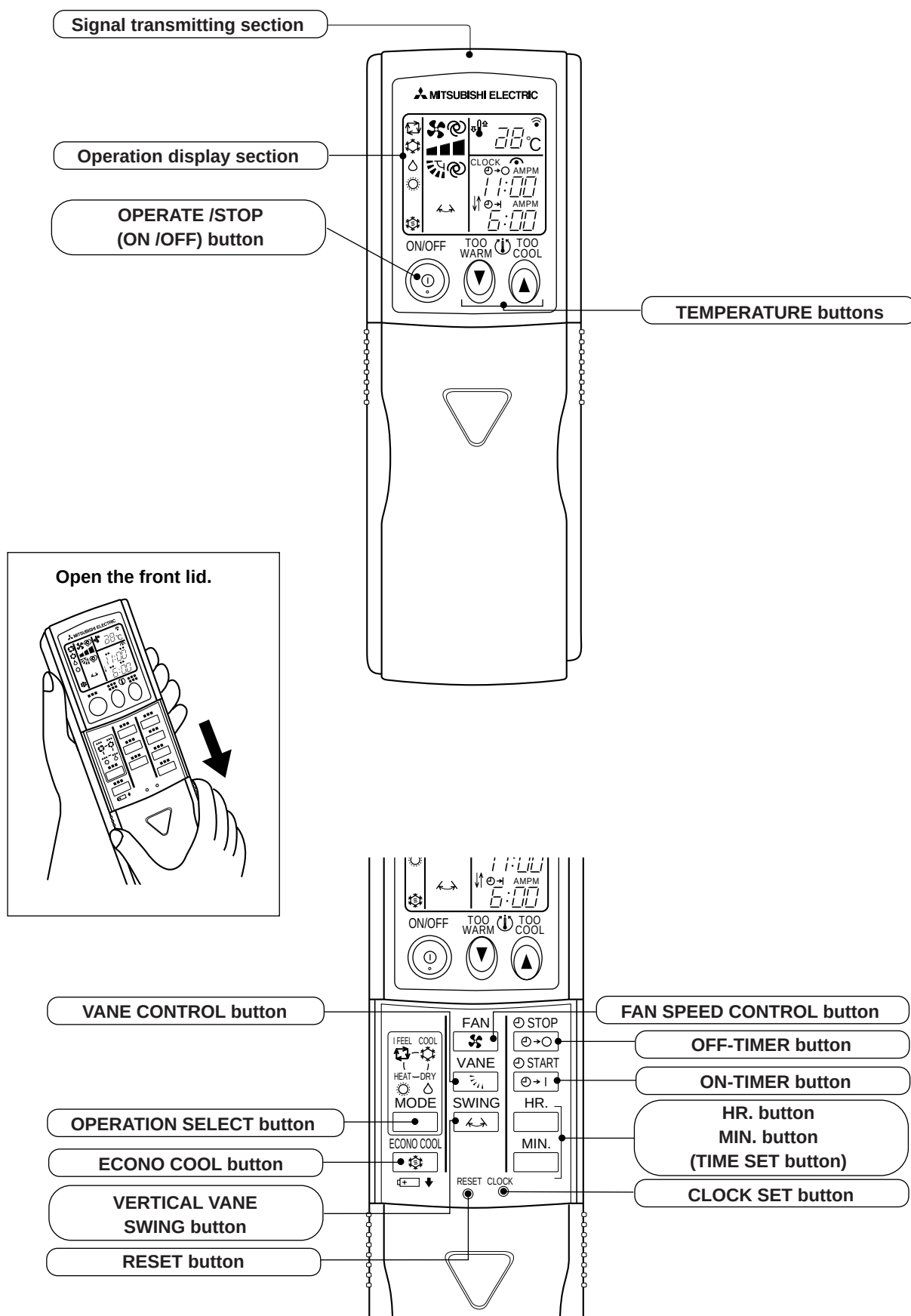
MSZ-G09SV - [E1]

MSZ-G12SV - [E1]

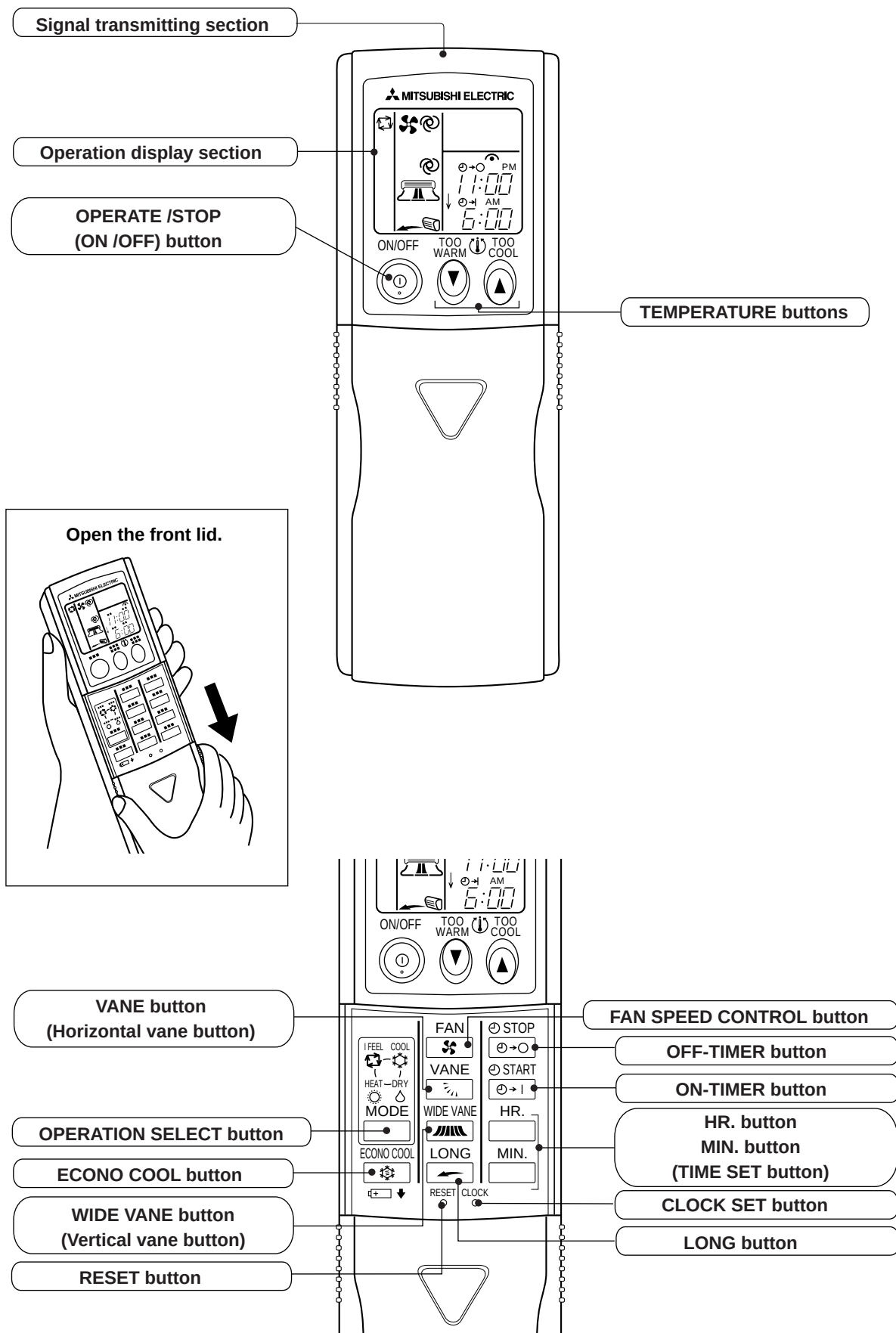


MSZ-G09SV -E2

MSZ-G12SV -E2



MSZ-G20SV - E1



Indoor model			MSZ-G09SV - E1 MSZ-G09SV - E2		MSZ-G12SV - E1 MSZ-G12SV - E2	
Function			Cooling	Heating	Cooling	Heating
Power supply			Single phase 230V,50Hz		Single phase 230V,50Hz	
Capacity	Capacity	kW	2.6 (1.3-3.1)	3.6 (1.4-5.1)	3.5 (0.9-4.0)	4.8 (0.9-6.7)
	Air flow(High/Med.*/Low*)	m³ /h	474/366*/252*	504/402*/312*	588/444*/312*	642/516*/366*
	Dehumidification	ℓ /h	1.2	—	1.6	—
Electrical data	Power outlet	A	10		10	
	Running current	A	4.54	5.50	6.20	7.40
	Power input	W	940 (440 - 1,120)	1,140 (430 - 1,300)	1,290 (290 - 1,390)	1,540 (290 - 2,090)
	Auxiliary heater	A(kW)	—		—	
	Power factor	%	90		90	
	Starting current	A	5.50		7.40	
	Fan motor current	A	0.17		0.19	
Coefficient of performance(C.O.P)			2.77	3.16	2.71	3.12
Fan motor	Model		RC4V19-BA		RC4V19-BA	
	Winding resistance(at20°C)	Ω	WHT-BLK 292 BLK-RED 325		WHT-BLK 292 BLK-RED 325	
	Dimensions W×H×D	mm	850×278×191		850×278×191	
Special remarks	Weight	kg	9		10	
	Air direction		5		5	
	Sound level(High/Med.*/Low*)	dB	36/29*/22*	35/29*/22*	39/32*/25*	39/34*/25*
	Fan speed(High/Med.*/Low*)	rpm	950/760*/570*	1,000/830*/670*	1,020/810*/620*	1,100/920*/700*
	Fan speed regulator		3		3	
	Thermistor RT11(at25°C)	kΩ	10		10	
	Thermistor RT12(at25°C)	kΩ	10		10	
	Thermistor RT13(at25°C)	kΩ	10		10	
Outdoor model			MUZ-G09SV - E1 MUZ-G09SV - E2		MUZ-G12SV - E1 MUZ-G12SV - E2	
Capacity	Air flow	m³ /h	1,500		1,560	
Electrical data	Compressor motor current	A	4.12	5.08	5.67	6.87
	Fan motor current	A	0.25		0.34	
Compressor	Model		KHV-104FGK		SHV-130FEA	
	Output	W	900		1,100	
	Winding resistance(at20°C)	Ω	U-V 2.14 U-W 2.14 V-W 2.14		U-V 0.45 U-W 0.45 V-W 0.45	
Fan motor	Model		RA6V18-AA		RA6V28-DA	
	Winding resistance(at20°C)	Ω	WHT-BLK 279 BLK-RED 198		WHT-BLK 201 BLK-RED 350	
	Dimensions W×H×D	mm	710(+69)×540×255		710(+69)×540×255	
Special remarks	Weight	kg	28		34	
	Sound level	dB	45		48	
	Fan speed	rpm	600		720	
	Fan speed regulator		1		1	
	Refrigerant filling capacity(R22)	kg	0.75		1.10	
	Refrigerating oil (Model)	cc	270 (MS56)		350 (MS56)	
	Thermistor RT61(at0°C)	kΩ	33.2		33.2	
	Thermistor RT62(at100°C)	kΩ	13.4		13.4	
	Thermistor RT64(at70°C)	kΩ	7.9		7.9	

NOTE : Test conditions are based on ISO 5151
Cooling : Indoor DB27°C WB19°C
Outdoor DB35°C WB 24°C
Heating : Indoor DB 20°C WB15°C
Outdoor DB 7°C WB 6°C
Refrigerant piping length (one way): 5m
* Reference value

Indoor model			MSZ-G20SV - E1	
Function			Cooling	Heating
Power supply			Single phase 230V, 50Hz	
Capacity	Capacity	kW	5.3	6.1
	Air flow(High/Med.*/Low*)	m³ /h	960/822*/684*	960/834*/732*
	Dehumidification	ℓ /h	1.7	—
Electrical data	Power outlet	A	20	
	Running current	A	11.20	9.32
	Power input	W	2,320	1,930
	Auxiliary heater	A(kW)	—	
	Power factor	%	90	
	Starting current	A	11.20	
	Fan motor current	A	0.30	
Coefficient of performance(C.O.P)			2.28	3.16
Fan motor	Model		RC4V40-AA	
	Winding resistance(at20°C)	Ω	WHT-BLK 138.2 BLK-RED 159.0	
	Dimensions W×H×D	mm	1,100×325×227	
	Weight	kg	16	
Special remarks	Air direction		5	
	Sound level(High/Med.*/Low*)	dB	47/43*/39*	
	Fan speed(High/Med.*/Low*)	rpm	1,280/1,130*/970*	1,280/1,150*/1,020*
	Fan speed regulator		3	
	Thermistor RT11(at25°C)	kΩ	10	
	Thermistor RT12(at25°C)	kΩ	10	
	Thermistor RT13(at25°C)	kΩ	10	
Outdoor model			MUZ-G20SV - E1	
Capacity	Air flow(High/Low*)	m³ /h	1,860/1,560*	
Electrical data	Compressor motor current	A	10.79	8.91
	Fan motor current	A	0.38	
Compressor	Model		SHV-130FEA	
	Output	W	1,400	
	Winding resistance(at20°C)	Ω	U-V 0.45 V-W 0.45 W-U 0.45	
Fan motor	Model		RA6V35-AA	
	Winding resistance(at20°C)	Ω	WHT-BLK 236.2 BLK-YLW 48.1 BLK-RED 224.1	
	Dimensions W×H×D	mm	800(+69)×600×300	
	Weight	kg	45	
Special remarks	Sound level(High)	dB	68	
	Fan speed(High/Low*)	rpm	630/560*	
	Fan speed regulator		2	
	Refrigerant filling capacity(R22)	kg	1.55	
	Refrigerating oil (Model)	cc	350 (MS-56)	
	Thermistor RT61(at100°C)	kΩ	13.4	
	Thermistor RT62(at25°C)	kΩ	10.0	
	Thermistor RT67(at70°C)	kΩ	7.9	

NOTE : Test conditions are based on ISO 5151

Cooling : Indoor DB27°C WB19°C

Outdoor DB35°C WB 24°C

Heating : Indoor DB 20°C WB15°C

Outdoor DB 7°C WB 6°C

Refrigerant piping length (one way): 5m

* Reference value

Specifications and rating conditions of main electric parts

INDOOR UNIT

Item	Model	MSZ-G09SV - E1	MSZ-G12SV - E1
		MSZ-G09SV - E2	MSZ-G12SV - E2
Indoor fan capacitor	(C11)	1.5 μ F 440V	
Fuse	(F11)	250V 3.15A	
Thermal fuse	(F12)	93°C 5A 250V	
Vane motor	(MV1, MV2)	MP20GA 12V 300 Ω	
Varistor	(NR11)	ERZV10D471	
Solid state relay	(SR141)	S201DH1Y	
Terminal block	(TB)	5P	
Contactor	(52C)	JM1aN-ZTMP-DC12V	
Indoor fan motor thermal fuse		136°C $\pm$ 3°C 2A	

OUTDOOR UNIT

Item	Model	MUZ-G09SV - E1	MUZ-G12SV - E1
		MUZ-G09SV - E2	MUZ-G12SV - E2
Power-factor capacitor	(C61)	100 μ F 420V	165 μ F 420V
Smoothing capacitor	(C63)	1500 μ F 420V	2500 μ F 420V
Outdoor fan capacitor	(C65)	1.8 μ F 440V	
Current transformer	(CT61)	RR-18	
Diode stack	(DS61, DS62)	S25VB80	
Fuse	(F801)	250V 2A	
Fuse	(F901)	250V 1A	
Expansion valve coil	(LEV)	LAM-MD12ME 12VDC	
Reactor	(L61)	8A 8mH	15A 4.3mH
Current-detecting resistor (R61, R62)		70m Ω 5W	100m Ω 5W
Current-limiting resistor	(R64)	10 Ω 15W	10 Ω 20W
Solid state relay	(SSR61)	TLP3506	
Terminal block	(TB2)	4P	
Outdoor fan relay	(X61)	G5S-1	
Current-limiting relay	(X64)	G4A-1A	
R.V. coil	(21S4)	LB8 220-240V AC	
Noise filter		EM43261	EM43262
Transistor module		QM15TG-9B	QM20TG-9B

Specifications and rating conditions of main electric parts

INDOOR UNIT

Item	Model	MSZ-G20SV - 
Indoor fan capacitor	(C11)	2.5 μ F 440V
Fuse	(F11)	250V 3.15A
Vane motor	(MV1, MV2)	MP20 12V 300 Ω
Varistor	(NR11)	ERZV 10D 471
Solid state relay	(SR141)	S201 DH1Y 250V 1.5A
Terminal block	(TB)	4P

OUTDOOR UNIT

Item	Model	MUZ-G20SV - 
Power-factor capacitor	(C61)	165 μ F 400V
Smoothing capacitor	(C62)	2500 μ F 400V
Outdoor fan capacitor	(C65)	2.5 μ F 400V
Current transformer	(CT61)	RR-18
Current transformer	(CT62)	CT25E-31V1A
Diode stack	(DS61, DS62)	S25VB80 25A 800W
Fuse	(20A)	250V 20A
Fuse	(1A)	250V 1A
Fuse	(F911)	250V 1A
Fuse	(F912)	250V 3.15A
Intelligent power module	(IPM)	PM30CTJ060-3
Reactor	(L)	CH-85
Current-limiting resistor (R64A, R64B)		BWR10N10 Ω J
Current-detecting resistor (R61, R62)		0.07 Ω 5Wx2
Expansion valve coil	(LEV)	LAM-MD12ME 12VDC
Solenoid coil relay	(SSR61)	TLP3506
Terminal block	(TB1)	3P
Terminal block	(TB2)	4P
Outdoor fan relay	(X61)	G4U-1-EDC12V
Outdoor fan relay	(X62)	G4U-1-EDC12V
Relay	(X64)	G4A-1A-PS
R.V. coil	(21S4)	LB8 220-240VAC
Noise filter		DE00N285B02

4

NOISE CRITERIA CURVES

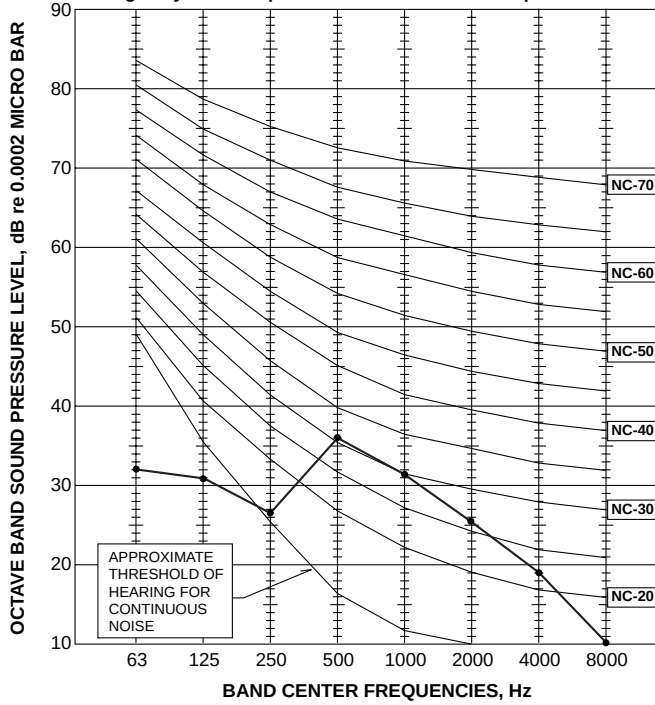
MSZ-G09SV - [E1]

MSZ-G09SV - [E2]

FAN SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	36	●—●
	HEATING		

Test conditions,

Cooling : Dry-bulb temperature 27°C Wet-bulb temperature 19°C
Heating : Dry-bulb temperature 20°C Wet-bulb temperature 15°C



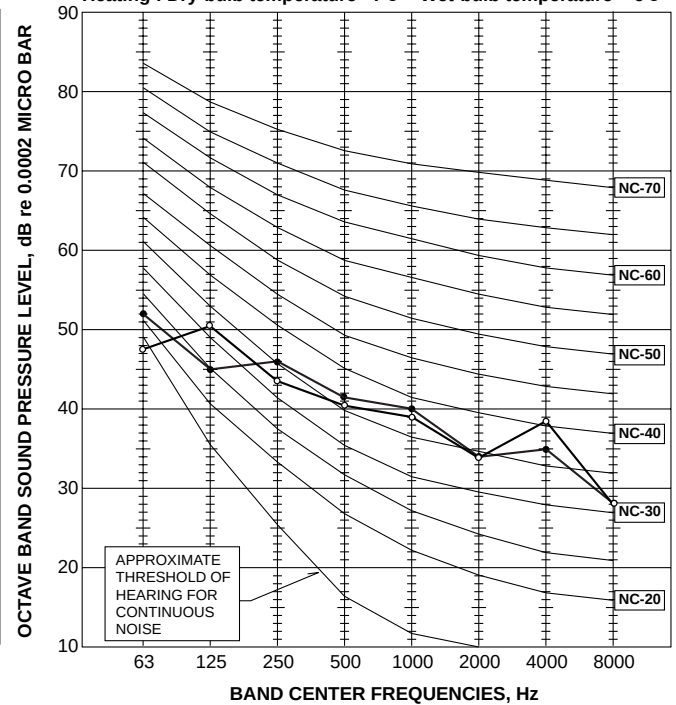
MUZ-G09SV - [E1]

MUZ-G09SV - [E2]

SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	45	●—●
	HEATING		

Test conditions,

Cooling : Dry-bulb temperature 35°C Wet-bulb temperature (24°C)
Heating : Dry-bulb temperature 7°C Wet-bulb temperature 6°C



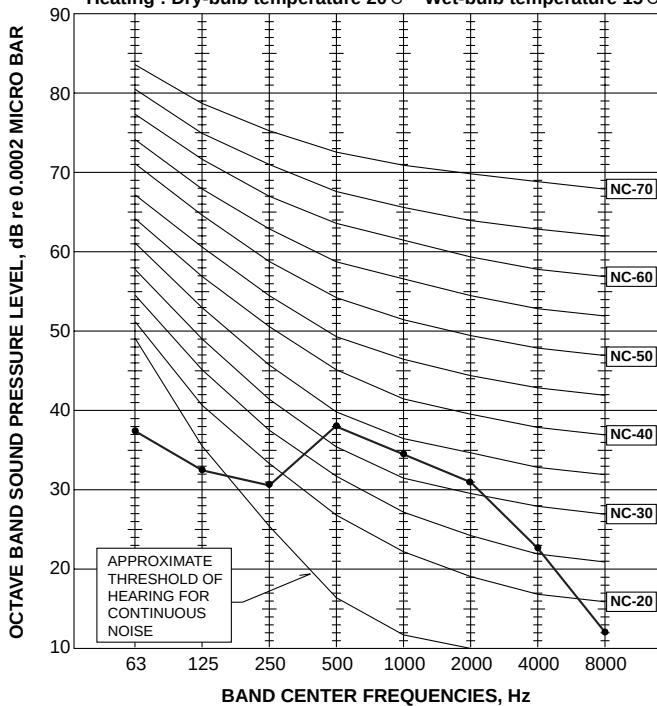
MSZ-G12SV - [E1]

MSZ-G12SV - [E2]

FAN SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	39	●—●
	HEATING		

Test conditions,

Cooling : Dry-bulb temperature 27°C Wet-bulb temperature 19°C
Heating : Dry-bulb temperature 20°C Wet-bulb temperature 15°C



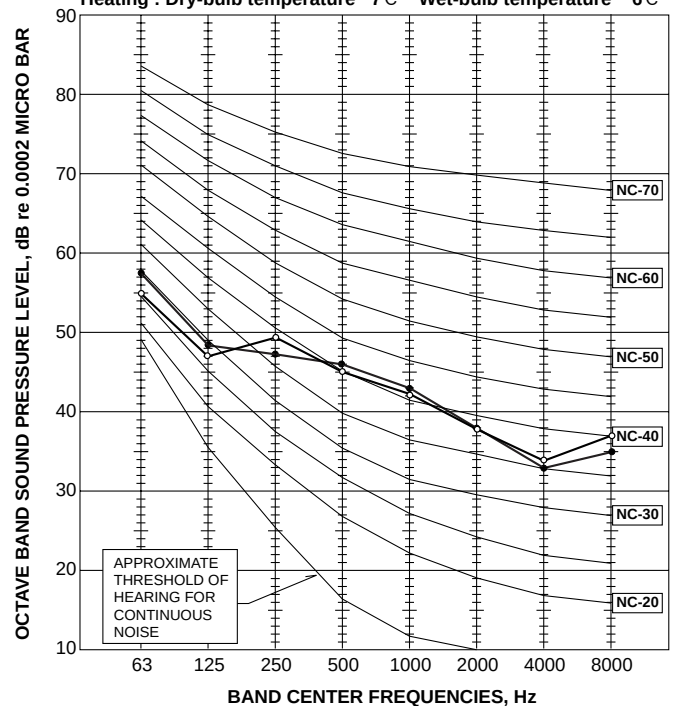
MUZ-G12SV - [E1]

MUZ-G12SV - [E2]

FAN SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	48	●—●
	HEATING		

Test conditions,

Cooling : Dry-bulb temperature 35°C Wet-bulb temperature (24°C)
Heating : Dry-bulb temperature 7°C Wet-bulb temperature 6°C

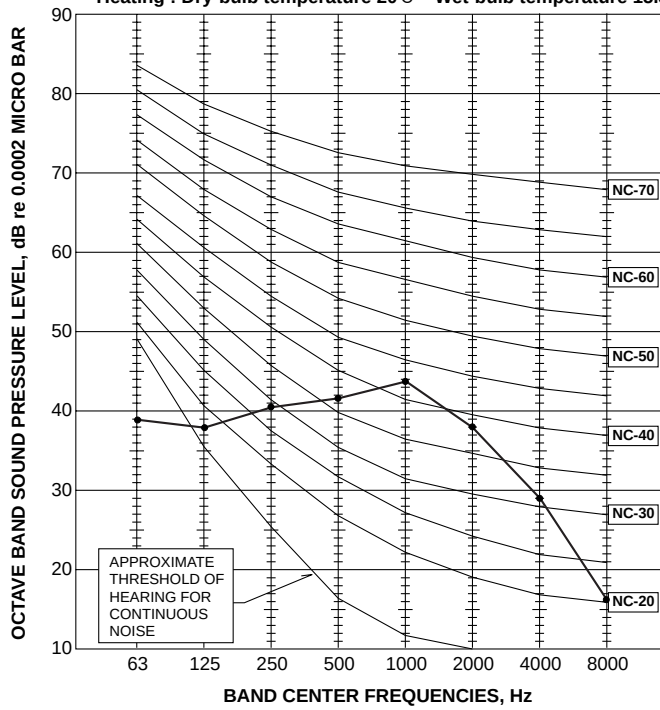


MSZ-G20SV -[E1]

FAN SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	47	●—●
	HEATING		○—○

Test conditions,

Cooling : Dry-bulb temperature 27°C Wet-bulb temperature 19°C
Heating : Dry-bulb temperature 20°C Wet-bulb temperature 15.5°C

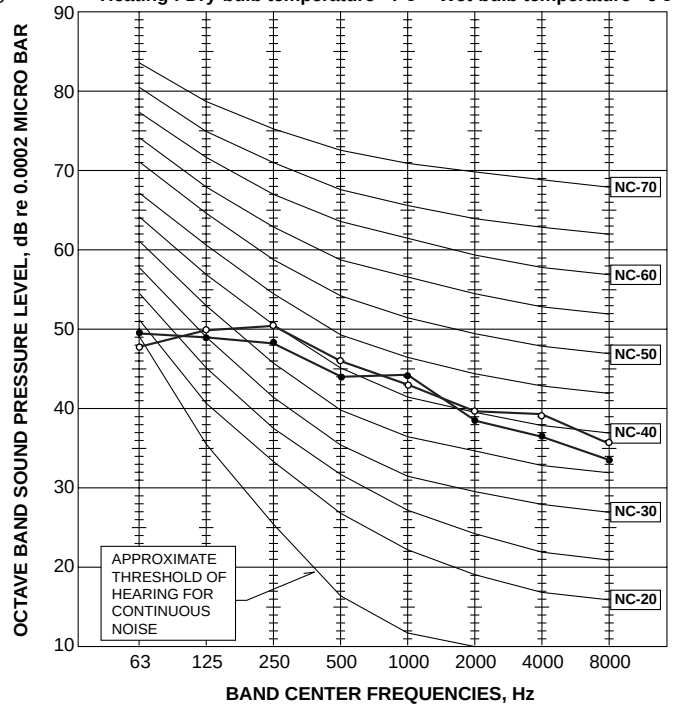


MUZ-G20SV -[E1]

FAM SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	48	●—●
	HEATING	49	○—○

Test conditions,

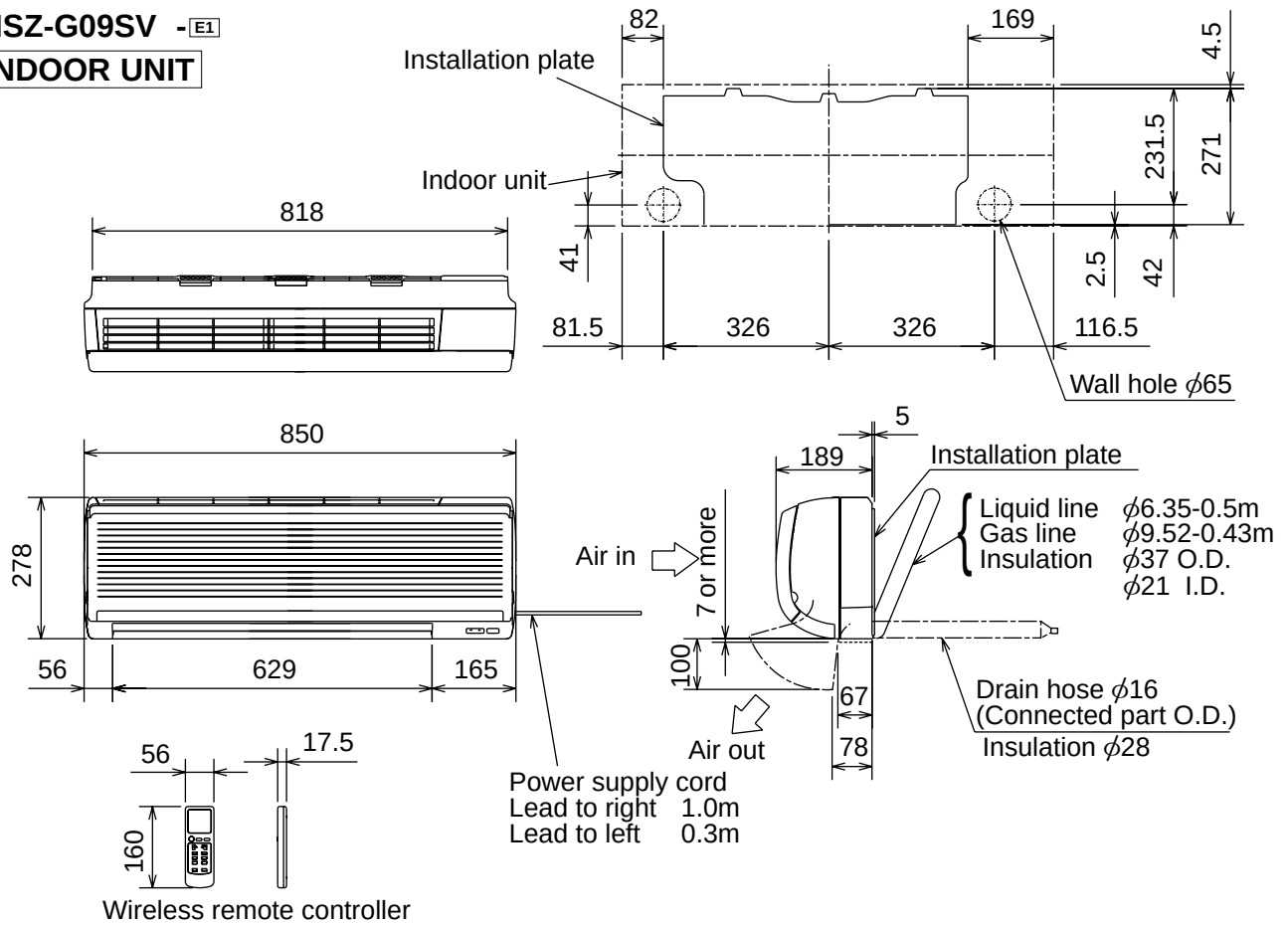
Cooling : Dry-bulb temperature 35°C Wet-bulb temperature 24°C
Heating : Dry-bulb temperature 7°C Wet-bulb temperature 6°C



Unit: mm

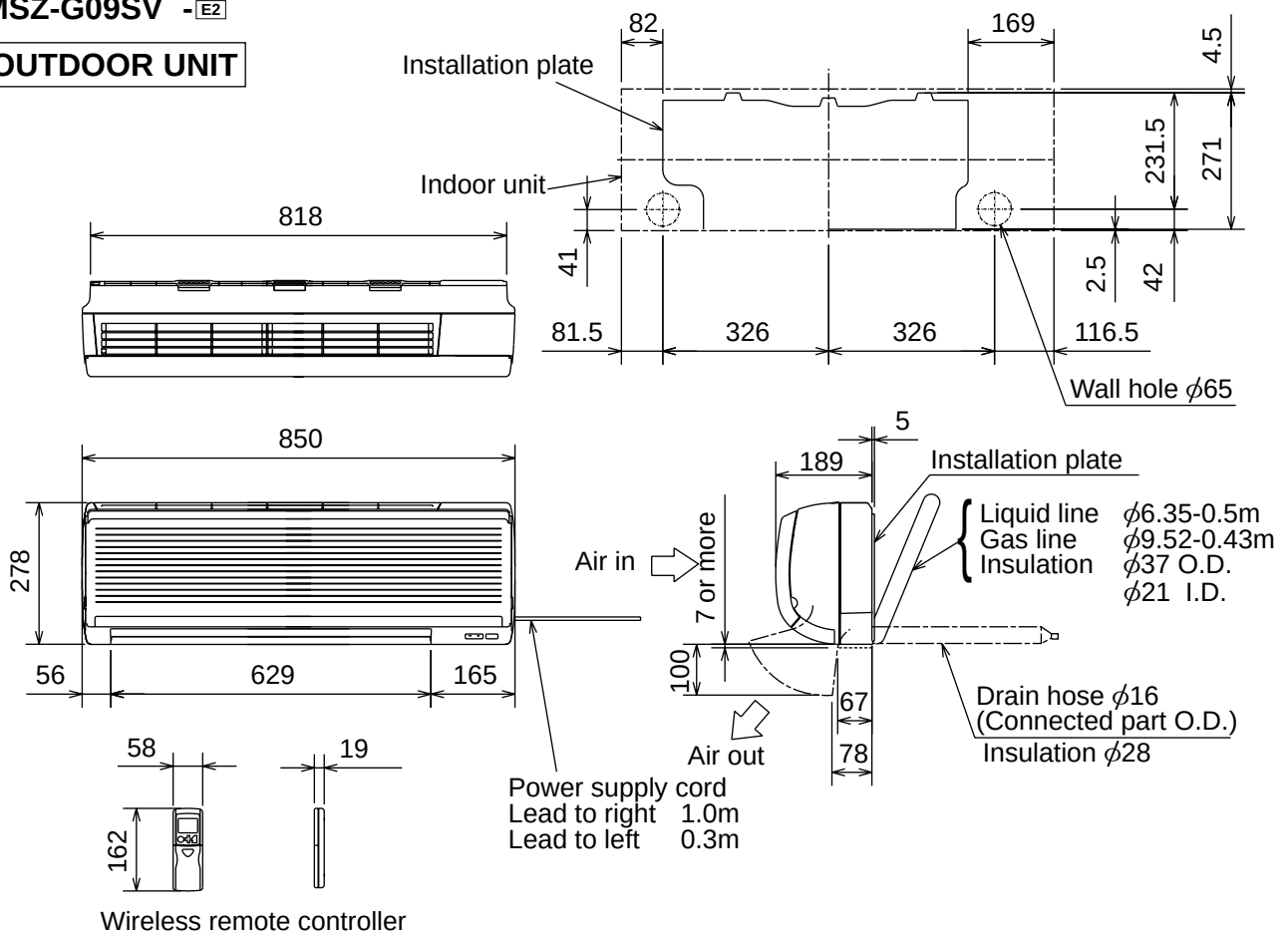
MSZ-G09SV - [E1]

INDOOR UNIT



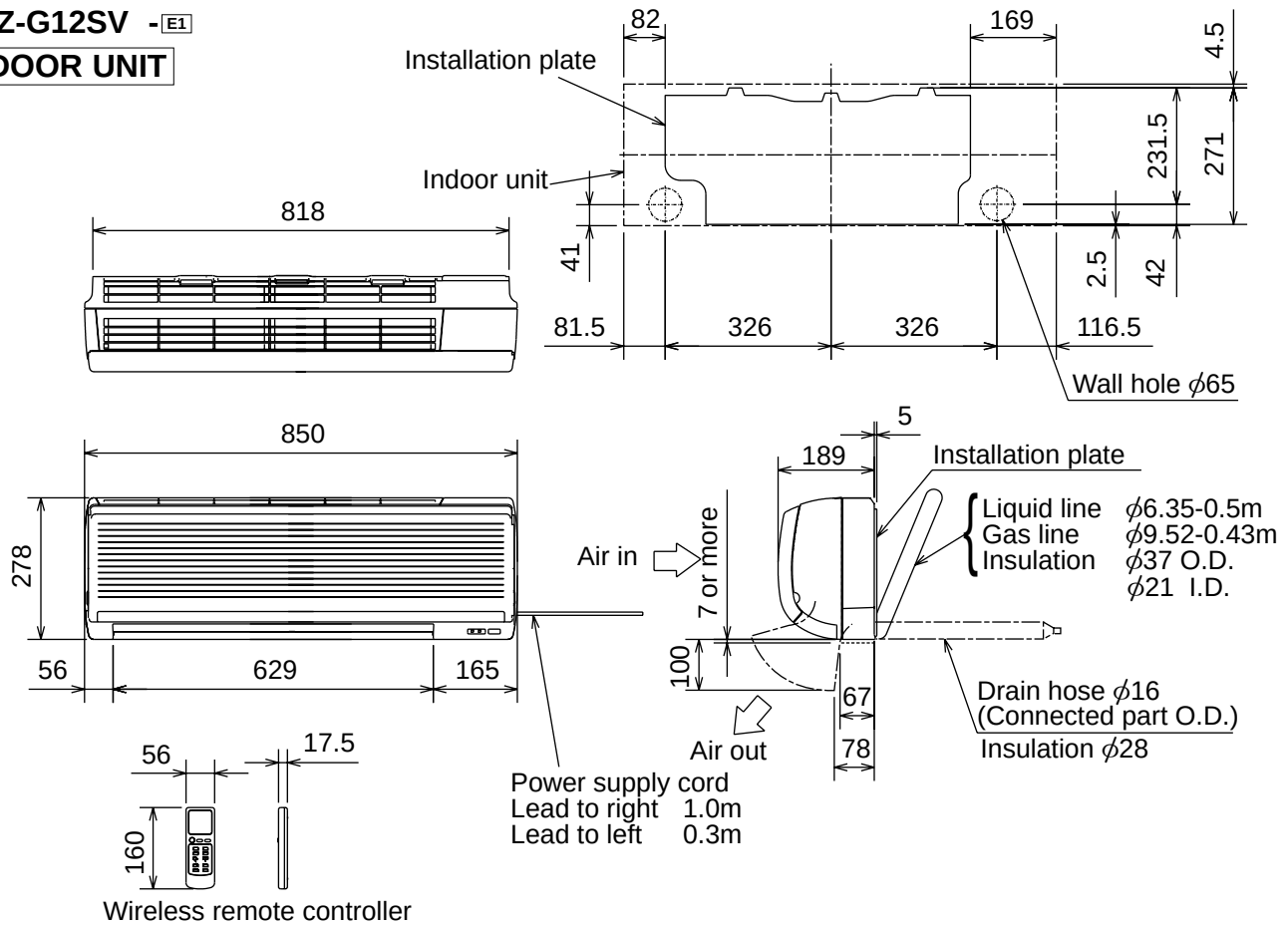
MSZ-G09SV - [E2]

OUTDOOR UNIT



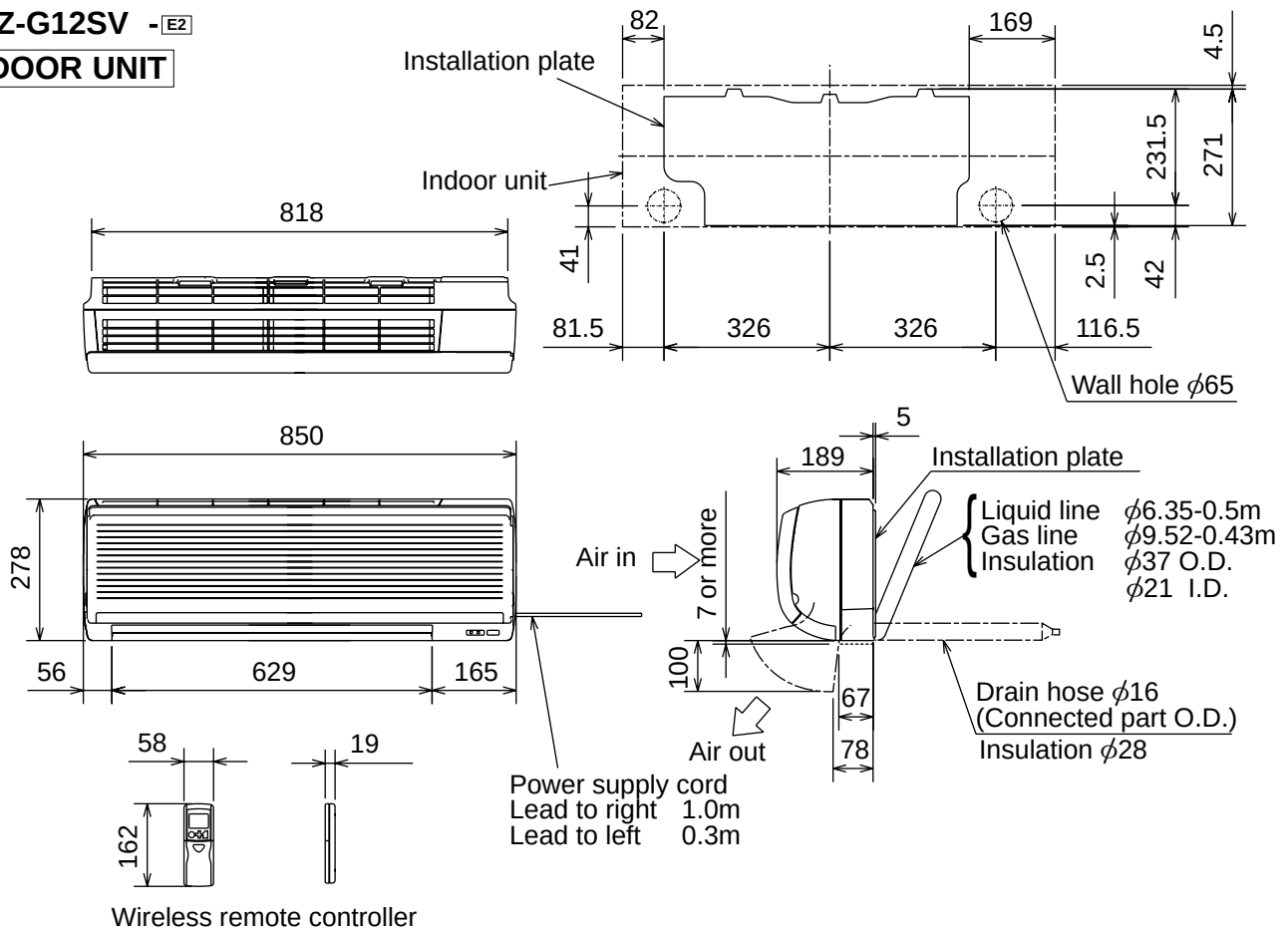
MSZ-G12SV - [E1]

INDOOR UNIT



MSZ-G12SV - [E2]

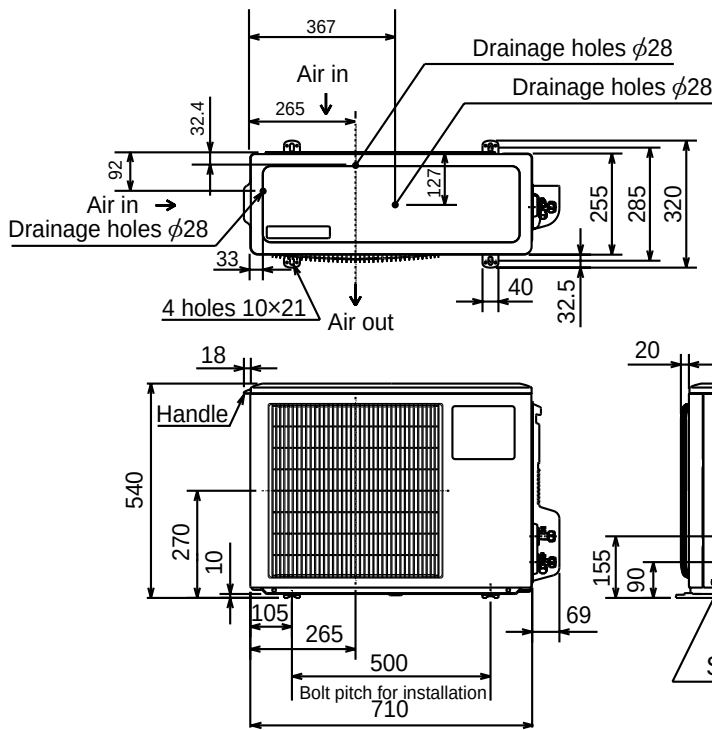
INDOOR UNIT



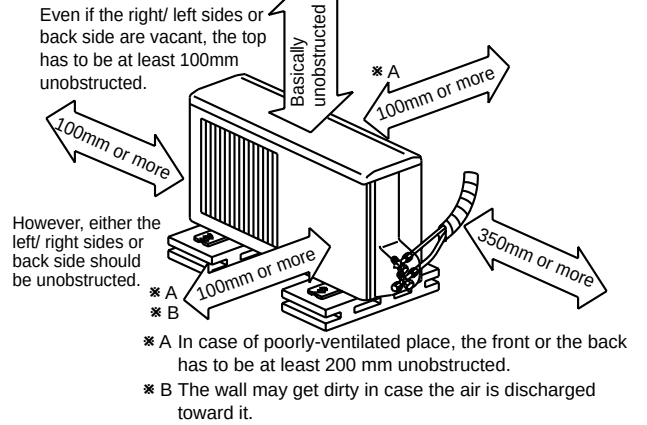
MUZ-G09SV - [E1] MUZ-G12SV - [E1]
 MUZ-G09SV - [E2] MUZ-G12SV - [E2]

Unit: mm

OUTDOOR UNIT

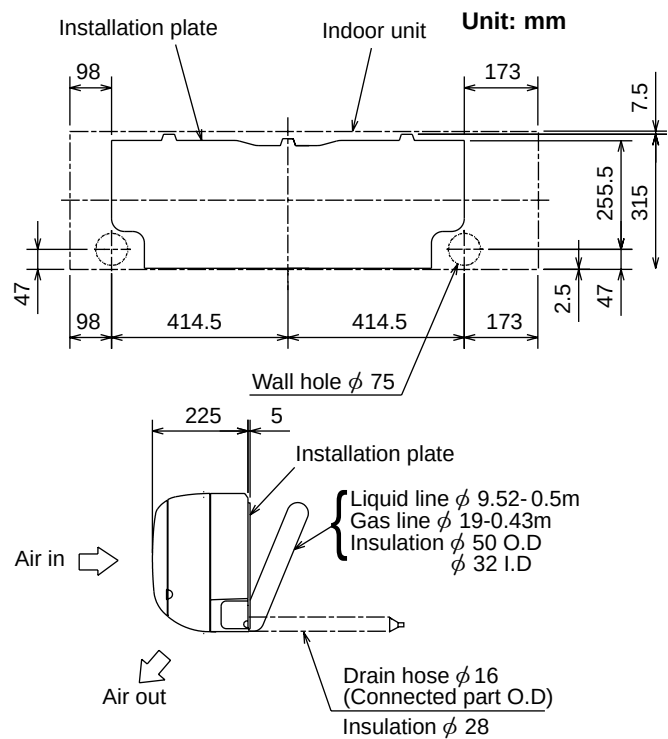
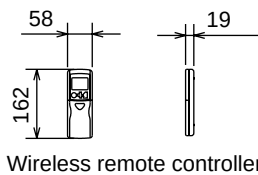
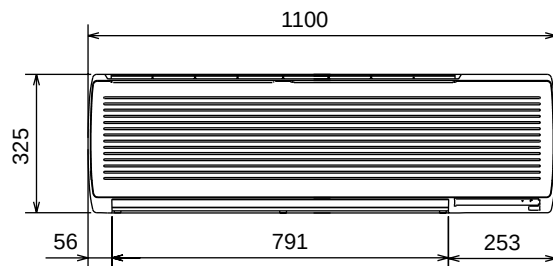
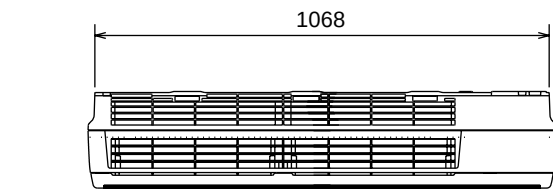


REQUIRED SPACE



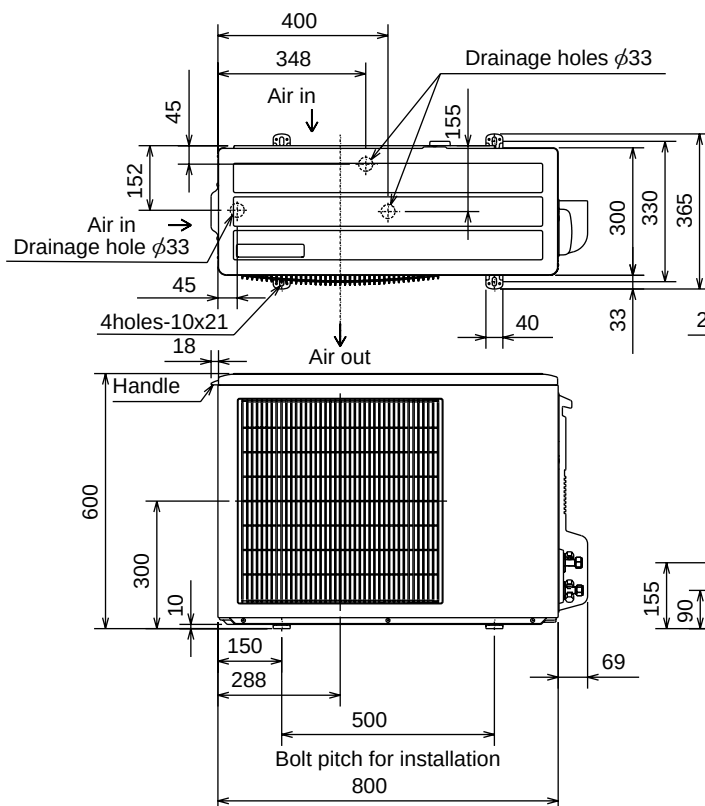
MSZ-G20SV - [E1]

INDOOR UNIT



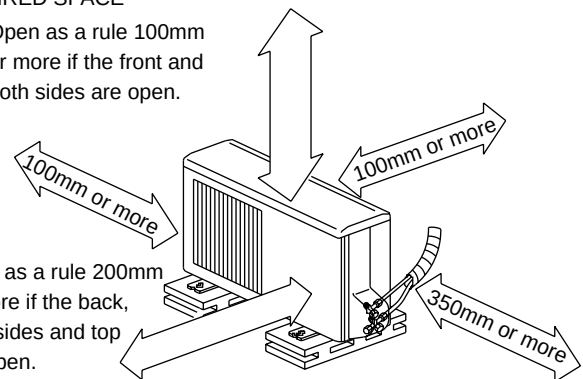
MUZ-G20SV - [E1]

OUTDOOR UNIT

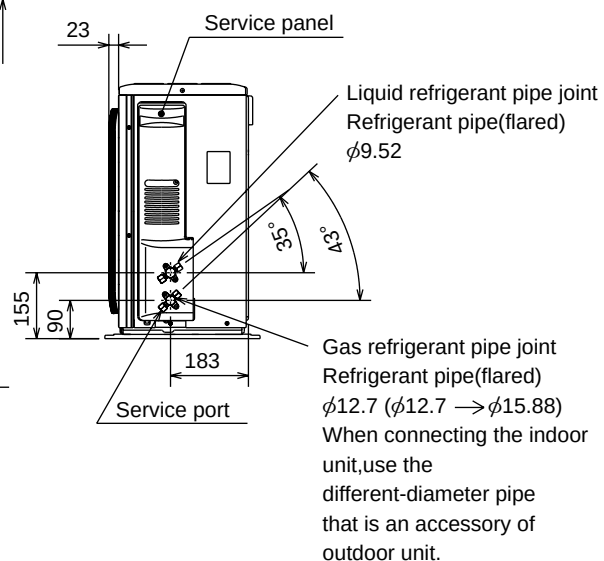


REQUIRED SPACE

Open as a rule 100mm or more if the front and both sides are open.



Open as a rule 200mm or more if the back, both sides and top are open.

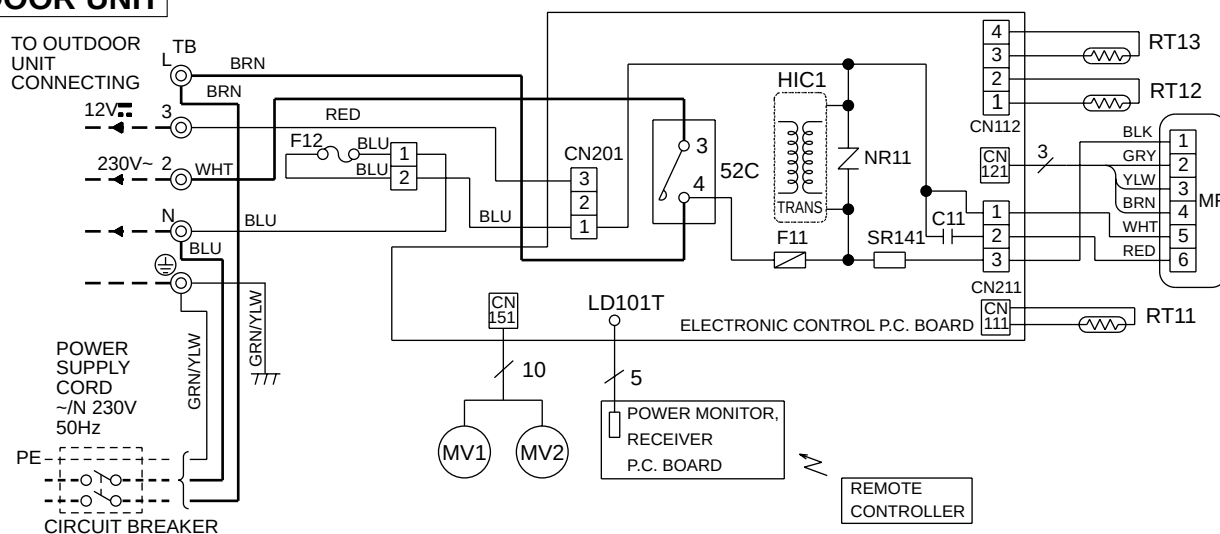


MSZ-G09SV -[E1]

MSZ-G12SV -[E1]

INDOOR UNIT

MODELS WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MV1	VANE MOTOR (HORIZONTAL)	RT13	INDOOR COIL THERMISTOR (SUB)
F11	FUSE (3.15A)	MV2	VANE MOTOR (VERTICAL)	SR141	SOLID STATE RELAY
F12	THERMAL FUSE (93°C)	NR11	VARISTOR	TB	TERMINAL BLOCK
HIC1	DC/DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR	52C	CONTACTOR
MF	INDOOR FAN MOTOR(INNER FUSE)	RT12	INDOOR COIL THERMISTOR (MAIN)		

NOTE:1. About the outdoor side electric wiring refer to the outdoor unit electric wiring diagram for servicing.

SG79B727H01

2. Use copper conductors only. (For field wiring)

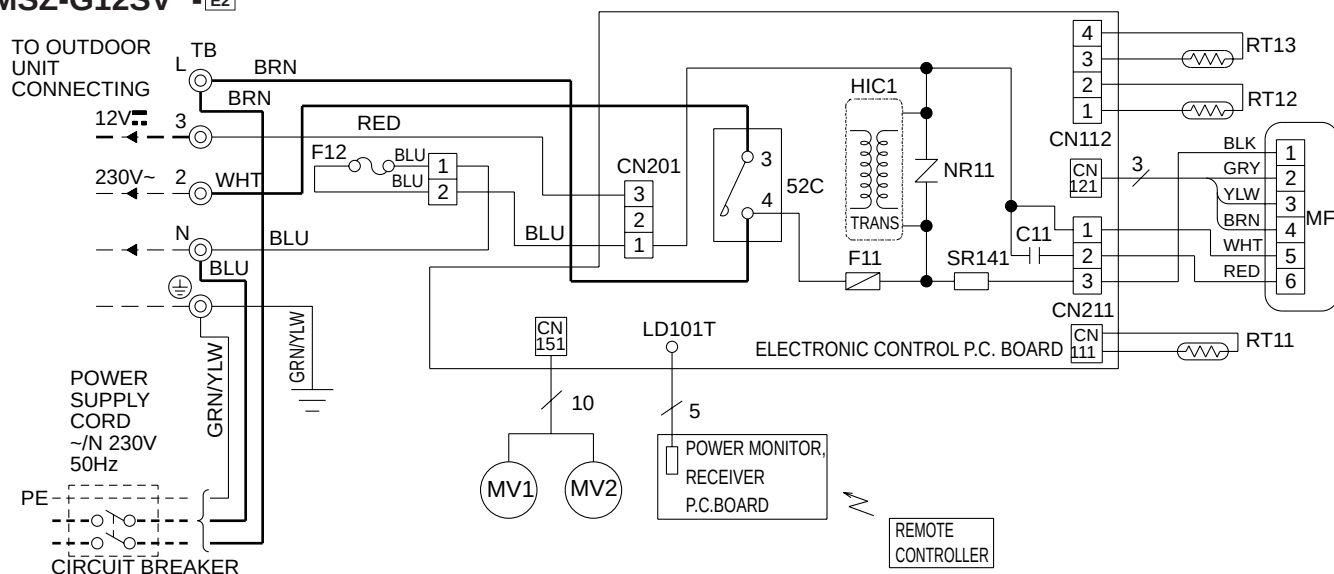
3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

MSZ-G09SV -[E2]

MSZ-G12SV -[E2]

MODELS WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MV1	VANE MOTOR (HORIZONTAL)	RT13	INDOOR COIL THERMISTOR (SUB)
F11	FUSE (3.15A)	MV2	VANE MOTOR (VERTICAL)	SR141	SOLID STATE RELAY
F12	THERMAL FUSE (93°C)	NR11	VARISTOR	TB	TERMINAL BLOCK
HIC1	DC/DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR	52C	CONTACTOR
MF	INDOOR FAN MOTOR(INNER FUSE)	RT12	INDOOR COIL THERMISTOR (MAIN)		

NOTE:1. About the outdoor side electric wiring refer to the outdoor unit electric wiring diagram for servicing.

SG79J166H01

2. Use copper conductors only. (For field wiring)

3. Symbols below indicate.

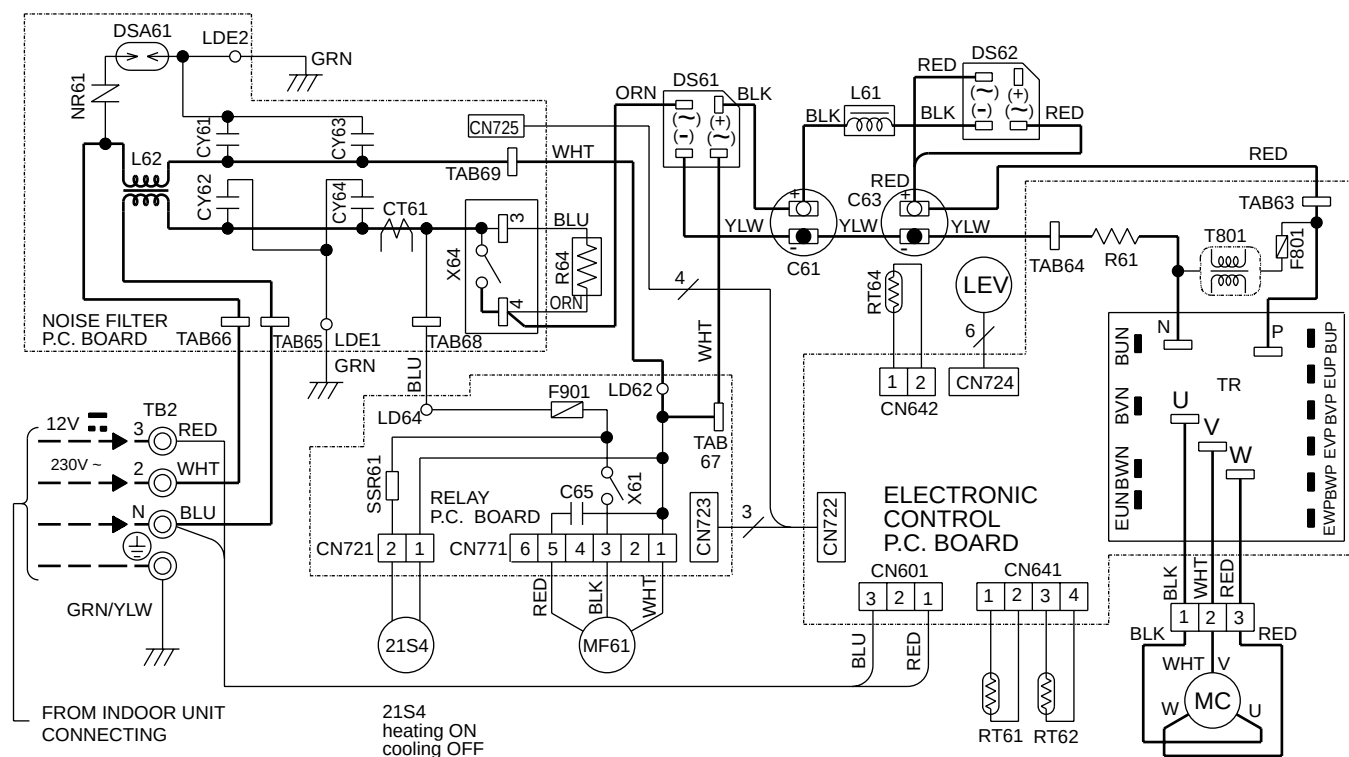
⊙: Terminal block, □□□□: Connector

MUZ-G09SV -E1

MUZ-G09SV -E2

OUTDOOR UNIT

MODELS WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C61	POWER-FACTOR CAPACITOR	L61	REACTOR	SSR61	SOLID STATE RELAY
C63	SMOOTHING CAPACITOR	L62	CMC COIL	TB2	TERMINAL BLOCK
C65	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR	TR	POWER TRANSISTOR MODULE
CT61	CURRENT TRANSFORMER	MF61	OUTDOOR FAN MOTOR(INNER PROTECTOR)	T801	TRANSFORMER
CY61~64	CAPACITOR	NR61	VARIATOR	X61	OUTDOOR FAN RELAY
DSA61	SURGE ABSORBER	RT61	DEFROST THERMISTOR	X64	CURRENT-LIMITING RELAY
DS61,62	DIODE STACK	RT62	DISCHARGE TEMPERATURE THERMISTOR	21S4	R.V. COIL
F801	FUSE (2A)	RT64	FIN TEMPERATURE THERMISTOR		
F901	FUSE (1A)	R61	CURRENT-DETECTING RESISTOR		
LEV	EXPANSION VALVE COIL	R64	CURRENT-LIMITING RESISTOR		

NOTE:1. About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.

2.Use copper conductors only. (For field wiring)

3. Symbols below indicate.

⊙: Terminal block, □□□: Connector

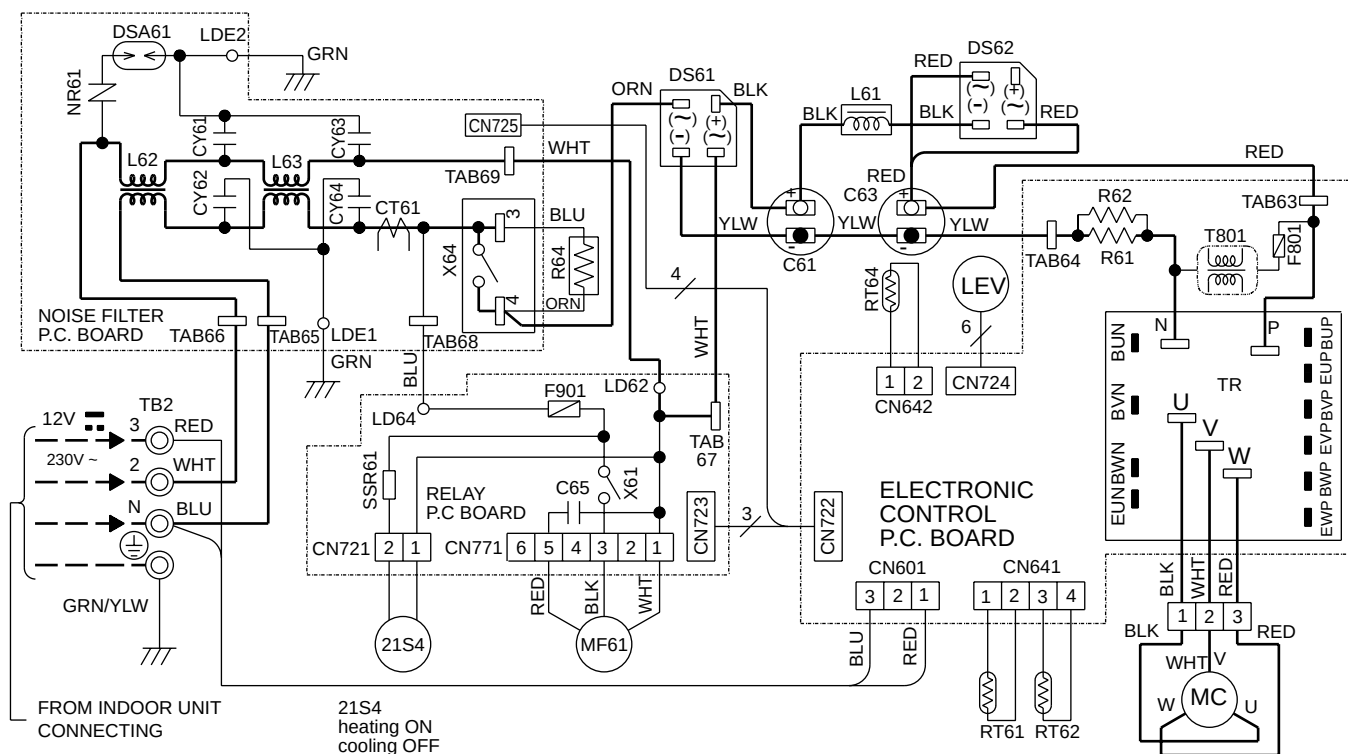
SG79B710H03

MUZ-G12SV -E1

MUZ-G12SV -E2

OUTDOOR UNIT

MODELS WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C61	POWER-FACTOR CAPACITOR	L61	REACTOR	SSR61	SOLID STATE RELAY
C63	SMOOTHING CAPACITOR	L62, 63	CMC COIL	TB2	TERMINAL BLOCK
C65	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR	TR	POWER TRANSISTOR MODULE
CT61	CURRENT TRANSFORMER	MF61	OUTDOOR FAN MOTOR(INNER PROTECTOR)	T801	TRANSFORMER
CY61~64	CAPACITOR	NR61	VARISTOR	X61	OUTDOOR FAN RELAY
DSA61	SURGE ABSORBER	RT61	DEFROST THERMISTOR	X64	CURRENT-LIMITING RELAY
DS61,62	DIODE STACK	RT62	DISCHARGE TEMPERATURE THERMISTOR	21S4	R.V. COIL
F801	FUSE (2A)	RT64	FIN TEMPERATURE THERMISTOR		
F901	FUSE (1A)	R61, 62	CURRENT-DETECTING RESISTOR		
LEV	EXPANSION VALVE COIL	R64	CURRENT-LIMITING RESISTOR		

SG79B873H03

NOTE:1. About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.

2. Use copper conductors only. (For field wiring)

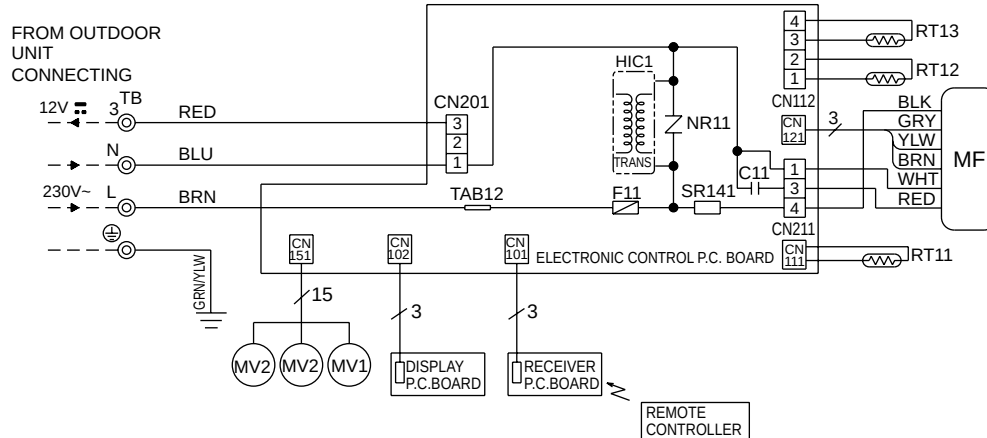
3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

MSZ-G20SV - E1

MODEL WIRING DIAGRAM

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MV2	VANE MOTOR(VERTICAL)	SR141	SOLID STATE RELAY
F11	FUSE(3.15A)	NR11	VARISTOR	TB	TERMINAL BLOCK
HIC1	DC/DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR		
MF	INDOOR FAN MOTOR(INNER PROTECTOR)	RT12	INDOOR COIL THERMISTOR (MAIN)		
MV1	VANE MOTOR(HORIZONTAL)	RT13	INDOOR COIL THERMISTOR (SUB)		

NOTE:1. About the outdoor side electric wiring refer to the outdoor unit electric wiring diagram for servicing.

2. Use copper conductors only. (For field wiring)

3. Symbols below indicate.

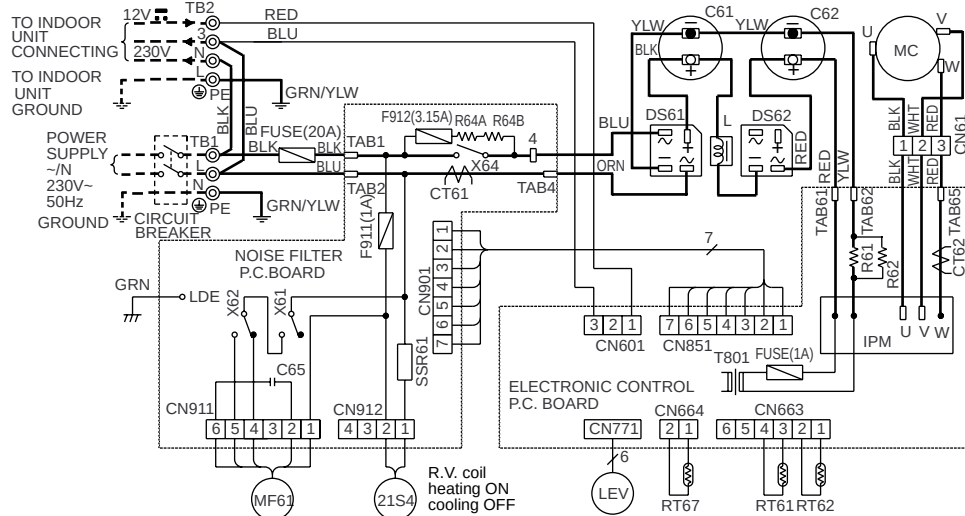
⊙: Terminal block, □□□□: Connector

SG79J610H01

MUZ-G20SV - E1

MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C61	POWER-FACTOR CAPACITOR	F912	FUSE(3.15A)	RT67	FIN TEMPERATURE THERMISTOR
C62	SMOOTHING CAPACITOR	IPM	INTELLIGENT POWER MODULE	SSR61	SOLENOID COIL RELAY
C65	OUTDOOR FAN CAPACITOR	L	REACTOR	T801	TRANSFORMER
CN61	CONNECTOR	R64A, R64B	CURRENT-LIMITING RESISTOR	TB1	TERMINAL BLOCK
CT61	CURRENT TRANSFORMER	R61, R62	CURRENT-DETECTING RESISTOR	TB2	TERMINAL BLOCK
CT62	CURRENT TRANSFORMER	LEV	EXPANSION VALVE COIL	X61	OUTDOOR FAN RELAY
DS61, DS62	DIODE STACK	MC	COMPRESSOR	X62	OUTDOOR FAN RELAY
FUSE	FUSE(20A)	MF61	OUTDOOR FAN MOTOR	X64	RELAY
FUSE	FUSE(1A)	RT61	DISCHARGE TEMPERATURE THERMISTOR	21S4	R.V. COIL
F911	FUSE(1A)	RT62	DEFROST THERMISTOR		

NOTE 1. About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.

2. Use copper conductors only. (For field wiring).

3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

SG79J612H01

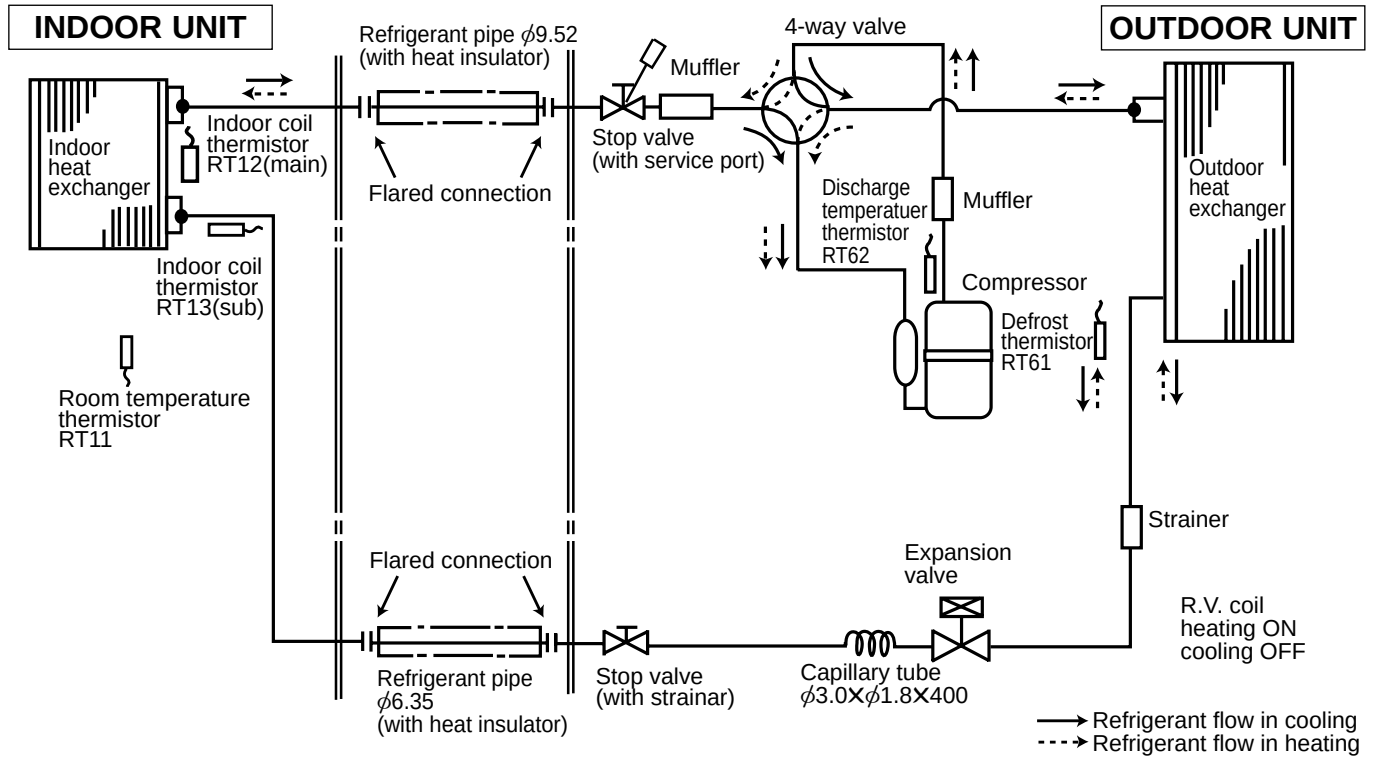
Unit:mm

MSZ-G09SV -[E1]

MSZ-G09SV -[E2]

MUZ-G09SV -[E1]

MUZ-G09SV -[E2]

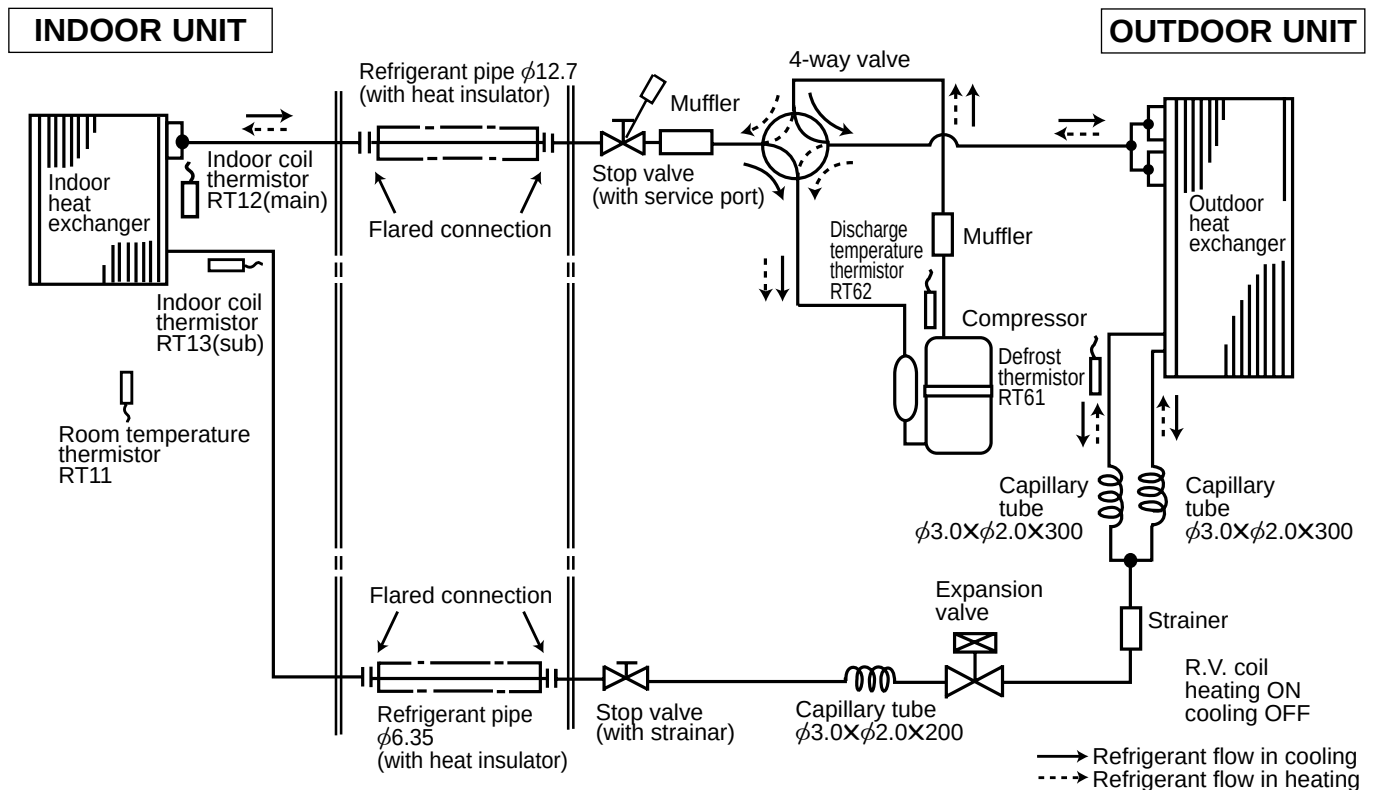


MSZ-G12SV -[E1]

MSZ-G12SV -[E2]

MUZ-G12SV -[E1]

MUZ-G12SV -[E2]



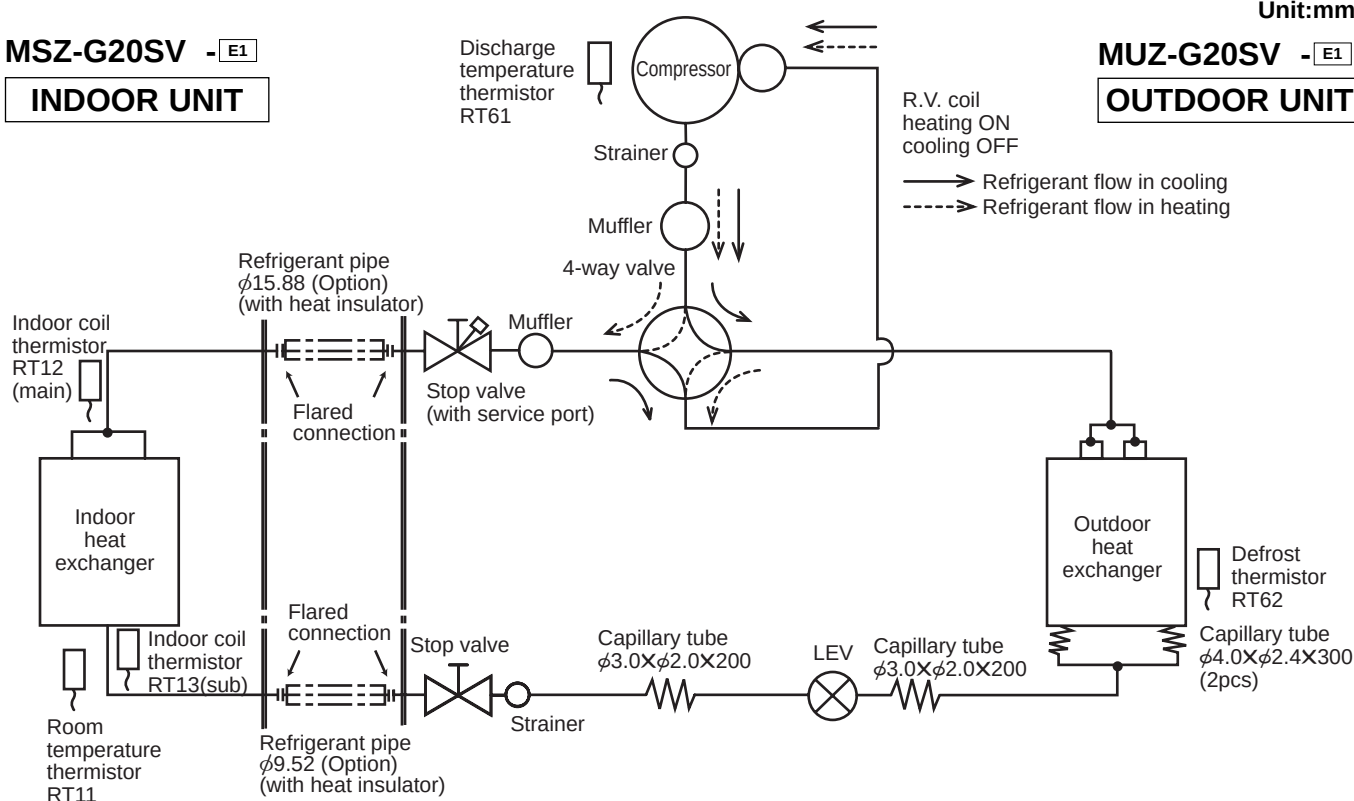
MSZ-G20SV - [E1]

INDOOR UNIT

Unit:mm

MUZ-G20SV - [E1]

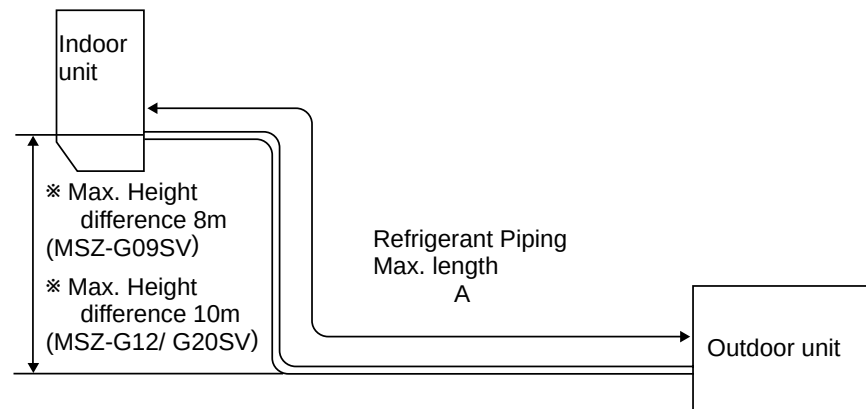
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m A	Piping size O.D : mm		Length of connecting pipe : m	
		Gas	Liquid	Indoor unit	Outdoor unit
MSZ-G09SV - [E1] MUZ-G09SV - [E1] MSZ-G09SV - [E2] MUZ-G09SV - [E2]	12	9.52	6.35	Gas 0.43 Liquid 0.5	—
MSZ-G12SV - [E1] MUZ-G12SV - [E1] MSZ-G12SV - [E2] MUZ-G12SV - [E2]	15	12.7			
MSZ-G20SV - [E1] MUZ-G20SV - [E1]		15.88	9.52		

MAX. HEIGHT DIFFERENCE



※ Height difference should be within 8m(MSZ-G09SV)/ 10m(MSZ-G12/ G20SV) regardless of which unit, indoor or outdoor position is high.

ADDITIONAL REFRIGERANT CHARGE (R22:g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)										
		5m	6m	7m	8m	9m	10m	11m	12m	13m	14m	15m
MSZ-G09SV - E1	750	0	30	60	90	120	150	180	210			
MUZ-G09SV - E1												
MSZ-G09SV - E2												
MUZ-G09SV - E2												
MSZ-G12SV - E1	1100	0	30	60	90	120	150	180	210	240	270	300
MUZ-G12SV - E1												
MSZ-G12SV - E2												
MUZ-G12SV - E2												

Calculation : $Xg = 30g/m \times (\text{Refrigerant piping length}(m) - 5)$

Model	Outdoor unit precharged	Refrigerant piping length (one way)		
		7m	10m	15m
MSZ-G20SV - E1	1,550	0	75	200
MUZ-G20SV - E1				

Calculation : $Xg = 25g/m \times (\text{Refrigerant piping length}(m) - 7)$

MSZ-G09SV -[E1] MSZ-G12SV -[E1] MUZ-G09SV -[E1] MUZ-G12SV -[E1]
 MSZ-G09SV -[E2] MSZ-G12SV -[E2] MUZ-G09SV -[E2] MUZ-G12SV -[E2]
 MSZ-G20SV -[E1] MUZ-G20SV -[E1]

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions. Since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

207 ~ 253V, 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

(3) MAIN READINGS

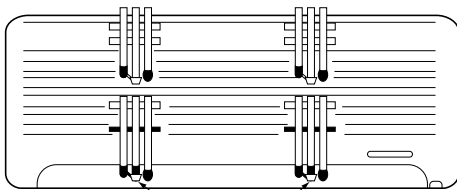
- | | | |
|---|-------|-----------|
| (1) Indoor intake air wet-bulb temperature : | °C WB | } Cooling |
| (2) Indoor outlet air wet-bulb temperature : | °C WB | |
| (3) Outdoor intake air dry-bulb temperature : | °C DB | |
| (4) Total input: | W | } Heating |
| (5) Indoor intake air dry-bulb temperature : | °C DB | |
| (6) Outdoor intake air wet-bulb temperature : | °C WB | |
| (7) Total input : | W | |

Indoor air wet/dry-bulb temperature difference on the left side of the chart on this page and next page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb / dry-bulb temperature difference

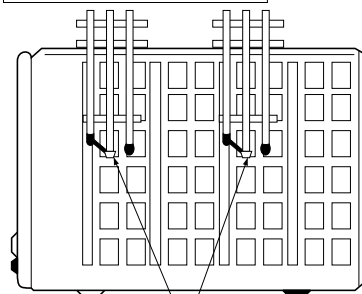
1. Attach at least 2 sets of wet and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet and dry-bulb thermometers to the outdoor air intake.
3. Cover the thermometers to prevent direct rays of the sun.
4. Check that the air filter is cleaned.
5. Open windows and doors of room.
6. Press the EMERGENCY OPERATION switch once (twice) to start the EMERGENCY COOL (HEAT) MODE.
7. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
8. 10 minutes later, measure temperature again and check that the temperature does not change.

INDOOR UNIT

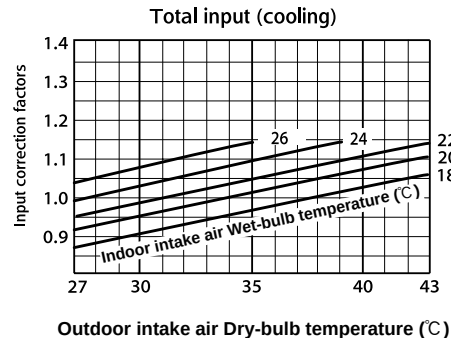
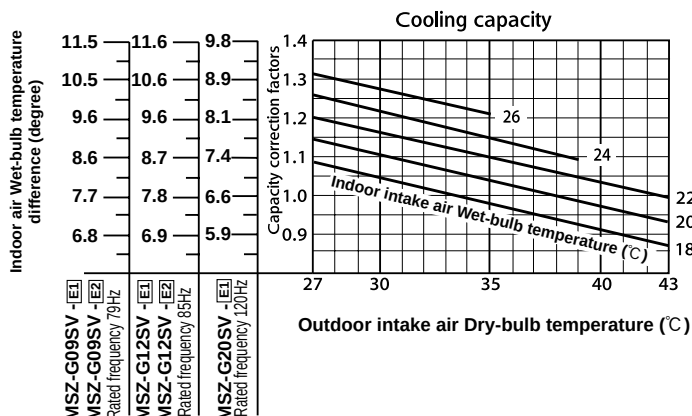


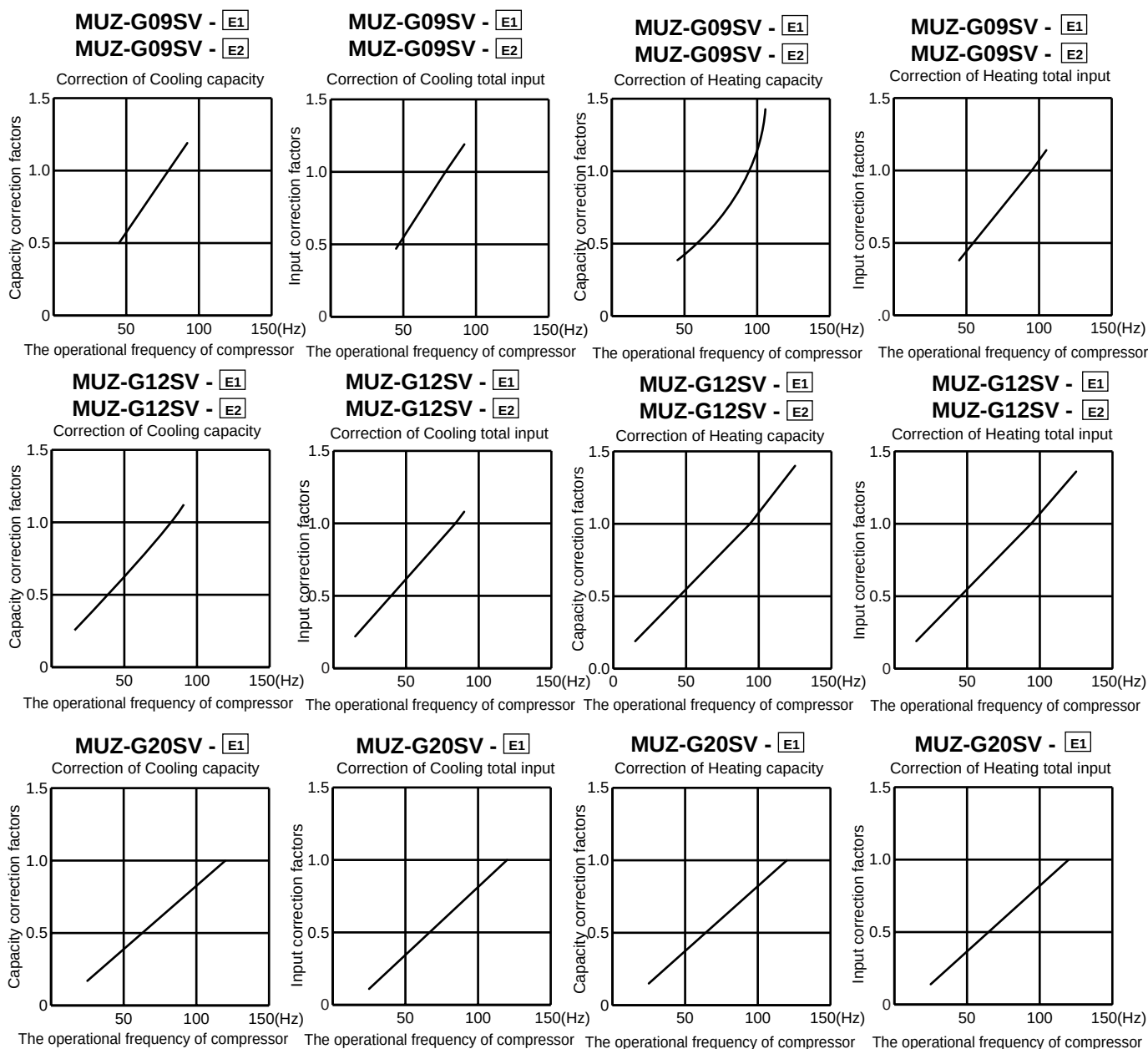
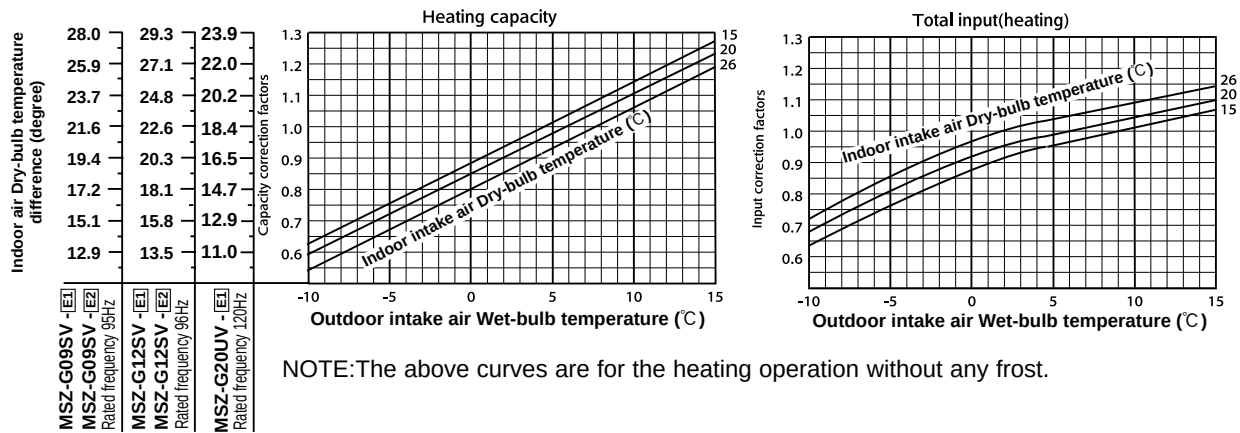
Wet and dry-bulb thermometers
FRONT VIEW

OUTDOOR UNIT



Wet and dry-bulb thermometers
BACK VIEW





OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

<How to operate fixed-frequency operation>

1. Press the EMERGENCY OPERATION switch to COOL or HEAT mode.
2. Compressor starts at 79Hz(MSZ-G09SV)/ 85Hz(MSZ-G12SV)/ 80Hz(MSZ-G20SV) in COOL mode or 58Hz(MSZ-G09/G12SV)/ 80Hz(MSZ-G20SV) in HEAT mode.
3. Indoor fan operates at High speed and continues for 30 minutes.
4. To cancel EMERGENCY OPERATION, press the EMERGENCY OPERATION switch or other switch on remote controller.

NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).

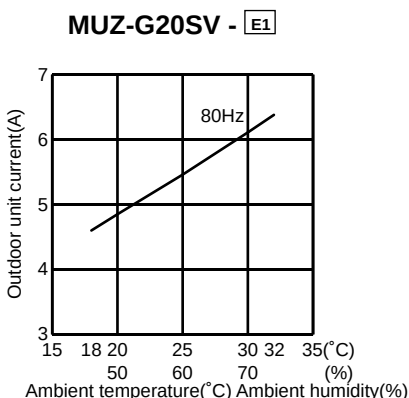
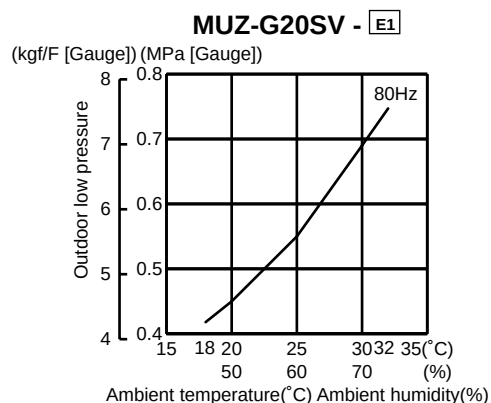
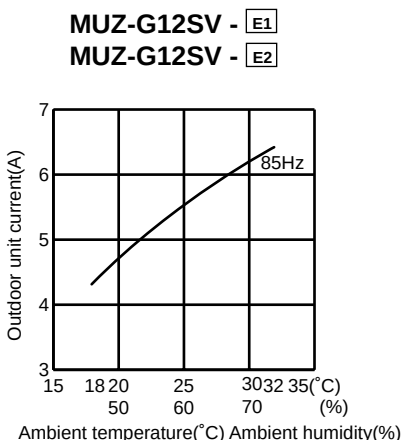
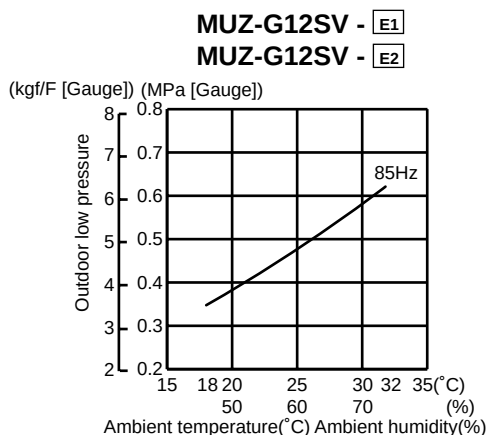
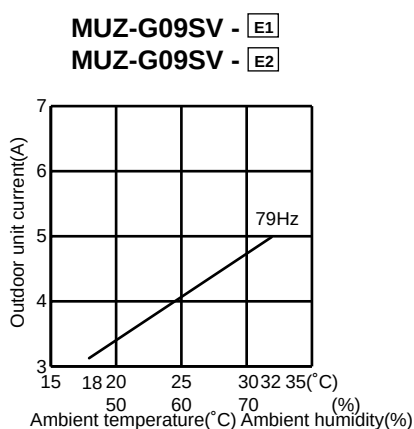
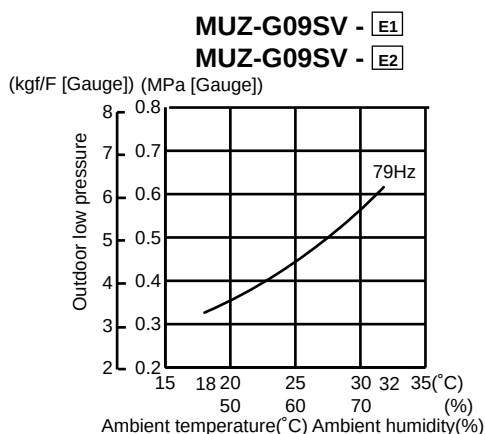
The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/cm² [Gauge])**

OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

COOL operation

- ① Both indoor and outdoor unit are under the same temperature/humidity condition.
- ② Air flow should be set at MAX.
- ③ Operational frequency : 79Hz(MSZ-G09SV)
85Hz(MSZ-G12SV)
80Hz(MSZ-G20SV)

Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70



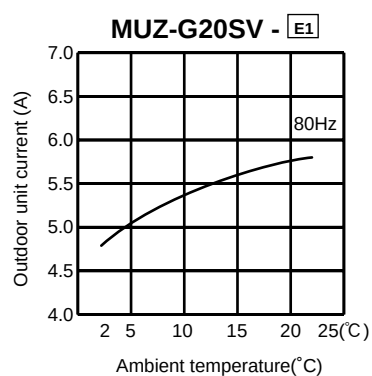
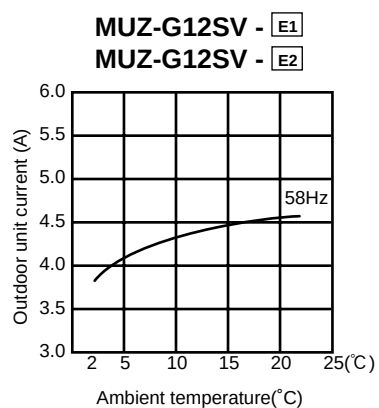
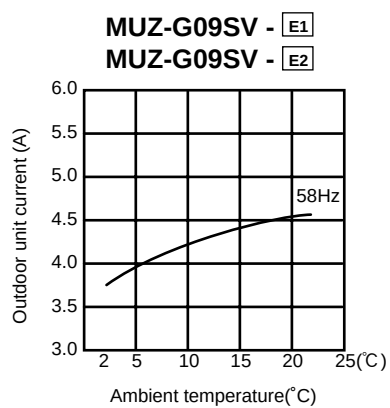
HEAT operation

Condition indoor: Dry bulb temperature 20.0°C

Wet bulb temperature 14.5°C

Condition outdoor: Dry bulb temperature 2,7,15,20.0°C

Wet bulb temperature 1,6,12,14.5°C



PERFORMANCE DATA COOL operation Rated frequency 79HZ

MSZ-G09SV -[E1] : MUZ-G09SV -[E1]

MSZ-G09SV -[E2] : MUZ-G09SV -[E2]

CAPACITY:2.6(KW) INPUT:940(W) SHF:0.68

INDOOR DB(°C)	INDOOR WB(°C)	OUTDOOR DB(°C)															
		21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.06	1.53	0.50	752	2.93	1.46	0.50	790	2.81	1.40	0.50	827	2.70	1.35	0.50	865
21	20	3.19	1.21	0.38	790	3.06	1.16	0.38	837	2.96	1.13	0.38	855	2.86	1.09	0.38	893
22	18	3.06	1.65	0.54	752	2.93	1.58	0.54	790	2.81	1.52	0.54	827	2.70	1.46	0.54	865
22	20	3.19	1.34	0.42	790	3.06	1.28	0.42	837	2.96	1.24	0.42	855	2.86	1.20	0.42	893
22	22	3.32	0.99	0.30	818	3.20	0.96	0.30	870	3.12	0.94	0.30	893	2.99	0.90	0.30	931
23	18	3.06	1.77	0.58	752	2.93	1.70	0.58	790	2.81	1.63	0.58	827	2.70	1.57	0.58	865
23	20	3.19	1.47	0.46	790	3.06	1.41	0.46	837	2.96	1.36	0.46	855	2.86	1.32	0.46	893
23	22	3.32	1.13	0.34	818	3.20	1.09	0.34	870	3.12	1.06	0.34	893	2.99	1.02	0.34	931
24	18	3.06	1.89	0.62	752	2.93	1.81	0.62	790	2.81	1.74	0.62	827	2.70	1.68	0.62	865
24	20	3.19	1.59	0.50	790	3.06	1.53	0.50	837	2.96	1.48	0.50	855	2.86	1.43	0.50	893
24	22	3.32	1.26	0.38	818	3.20	1.22	0.38	870	3.12	1.19	0.38	893	2.99	1.14	0.38	931
24	24	3.48	0.91	0.26	855	3.35	0.87	0.26	902	3.28	0.85	0.26	931	3.17	0.82	0.26	978
25	18	3.06	2.02	0.66	752	2.93	1.93	0.66	790	2.81	1.85	0.66	827	2.70	1.78	0.66	865
25	20	3.19	1.72	0.54	790	3.06	1.65	0.54	837	2.96	1.60	0.54	855	2.86	1.54	0.54	893
25	22	3.32	1.39	0.42	818	3.20	1.34	0.42	870	3.12	1.31	0.42	893	2.99	1.26	0.42	931
25	24	3.48	1.05	0.30	855	3.35	1.01	0.30	902	3.28	0.98	0.30	931	3.17	0.95	0.30	978
26	18	3.06	2.14	0.70	752	2.93	2.05	0.70	790	2.81	1.97	0.70	827	2.70	1.89	0.70	865
26	20	3.19	1.85	0.58	790	3.06	1.77	0.58	837	2.96	1.72	0.58	855	2.86	1.66	0.58	893
26	22	3.32	1.52	0.46	818	3.20	1.47	0.46	870	3.12	1.44	0.46	893	2.99	1.38	0.46	931
26	24	3.48	1.18	0.34	855	3.35	1.14	0.34	902	3.28	1.11	0.34	931	3.17	1.08	0.34	978
26	26	3.59	0.79	0.22	902	3.48	0.77	0.22	949	3.43	0.76	0.22	978	3.33	0.73	0.22	1006
27	18	3.06	2.26	0.74	752	2.93	2.16	0.74	790	2.81	2.08	0.74	827	2.70	2.00	0.74	865
27	20	3.19	1.97	0.62	790	3.06	1.89	0.62	837	2.96	1.84	0.62	855	2.86	1.77	0.62	893
27	22	3.32	1.66	0.50	818	3.20	1.60	0.50	870	3.12	1.56	0.50	893	2.99	1.50	0.50	931
27	24	3.48	1.32	0.38	855	3.35	1.27	0.38	902	3.28	1.24	0.38	931	3.17	1.21	0.38	978
27	26	3.59	0.93	0.26	902	3.48	0.91	0.26	949	3.43	0.89	0.26	978	3.33	0.87	0.26	1006
28	18	3.06	2.38	0.78	752	2.93	2.28	0.78	790	2.81	2.19	0.78	827	2.70	2.11	0.78	865
28	20	3.19	2.10	0.66	790	3.06	2.02	0.66	837	2.96	1.96	0.66	855	2.86	1.89	0.66	893
28	22	3.32	1.79	0.54	818	3.20	1.73	0.54	870	3.12	1.68	0.54	893	2.99	1.61	0.54	931
28	24	3.48	1.46	0.42	855	3.35	1.41	0.42	902	3.28	1.38	0.42	931	3.17	1.33	0.42	978
28	26	3.59	1.08	0.30	902	3.48	1.05	0.30	949	3.43	1.03	0.30	978	3.33	1.00	0.30	1006
29	18	3.06	2.51	0.82	752	2.93	2.40	0.82	790	2.81	2.30	0.82	827	2.70	2.22	0.82	865
29	20	3.19	2.23	0.70	790	3.06	2.14	0.70	837	2.96	2.07	0.70	855	2.86	2.00	0.70	893
29	22	3.32	1.92	0.58	818	3.20	1.85	0.58	870	3.12	1.81	0.58	893	2.99	1.73	0.58	931
29	24	3.48	1.60	0.46	855	3.35	1.54	0.46	902	3.28	1.51	0.46	931	3.17	1.46	0.46	978
29	26	3.59	1.22	0.34	902	3.48	1.18	0.34	949	3.43	1.17	0.34	978	3.33	1.13	0.34	1006
30	18	3.06	2.63	0.86	752	2.93	2.52	0.86	790	2.81	2.41	0.86	827	2.70	2.33	0.86	865
30	20	3.19	2.36	0.74	790	3.06	2.26	0.74	837	2.96	2.19	0.74	855	2.86	2.12	0.74	893
30	22	3.32	2.06	0.62	818	3.20	1.98	0.62	870	3.12	1.93	0.62	893	2.99	1.85	0.62	931
30	24	3.48	1.74	0.50	855	3.35	1.68	0.50	902	3.28	1.64	0.50	931	3.17	1.59	0.50	978
30	26	3.59	1.36	0.38	902	3.48	1.32	0.38	949	3.43	1.30	0.38	978	3.33	1.26	0.38	1006
31	18	3.06	2.75	0.90	752	2.93	2.63	0.90	790	2.81	2.53	0.90	827	2.70	2.43	0.90	865
31	20	3.19	2.48	0.78	790	3.06	2.38	0.78	837	2.96	2.31	0.78	855	2.86	2.23	0.78	893
31	22	3.32	2.19	0.66	818	3.20	2.11	0.66	870	3.12	2.06	0.66	893	2.99	1.97	0.66	931
31	24	3.48	1.88	0.54	855	3.35	1.81	0.54	902	3.28	1.77	0.54	931	3.17	1.71	0.54	978
31	26	3.59	1.51	0.42	902	3.48	1.46	0.42	949	3.43	1.44	0.42	978	3.33	1.40	0.42	1006
32	18	3.06	2.87	0.94	752	2.93	2.75	0.94	790	2.81	2.64	0.94	827	2.70	2.54	0.94	865
32	20	3.19	2.61	0.82	790	3.06	2.51	0.82	837	2.96	2.43	0.82	855	2.86	2.35	0.82	893
32	22	3.32	2.32	0.70	818	3.20	2.24	0.70	870	3.12	2.18	0.70	893	2.99	2.09	0.70	931
32	24	3.48	2.02	0.58	855	3.35	1.95	0.58	902	3.28	1.90	0.58	931	3.17	1.84	0.58	978
32	26	3.59	1.65	0.46	902	3.48	1.60	0.46	949	3.43	1.58	0.46	978	3.33	1.53	0.46	1006

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation Rated frequency 79Hz

MSZ-G09SV -[E1] : MUZ-G09SV -[E1]

MSZ-G09SV -[E2] : MUZ-G09SV -[E2]

CAPACITY:2.6(KW) SHF:0.68 INPUT:940(W)

INDOOR DB(°C)	INDOOR WB(°C)	OUTDOOR DB(°C)															
		35				40				43				46			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	2.55	1.27	0.50	921	2.34	1.17	0.50	978	2.25	1.12	0.50	996	2.16	1.08	0.50	1015
21	20	2.68	1.02	0.38	959	2.50	0.95	0.38	1006	2.41	0.91	0.38	1034	2.31	0.88	0.38	1062
22	18	2.55	1.38	0.54	921	2.34	1.26	0.54	978	2.25	1.21	0.54	996	2.16	1.17	0.54	1015
22	20	2.68	1.12	0.42	959	2.50	1.05	0.42	1006	2.41	1.01	0.42	1034	2.31	0.97	0.42	1062
22	22	2.83	0.85	0.30	996	2.65	0.80	0.30	1053	2.56	0.77	0.30	1072	2.47	0.74	0.30	1090
23	18	2.55	1.48	0.58	921	2.34	1.36	0.58	978	2.25	1.30	0.58	996	2.16	1.25	0.58	1015
23	20	2.68	1.23	0.46	959	2.50	1.15	0.46	1006	2.41	1.11	0.46	1034	2.31	1.06	0.46	1062
23	22	2.83	0.96	0.34	996	2.65	0.90	0.34	1053	2.56	0.87	0.34	1072	2.47	0.84	0.34	1090
24	18	2.55	1.58	0.62	921	2.34	1.45	0.62	978	2.25	1.39	0.62	996	2.16	1.34	0.62	1015
24	20	2.68	1.34	0.50	959	2.50	1.25	0.50	1006	2.41	1.20	0.50	1034	2.31	1.16	0.50	1062
24	22	2.83	1.08	0.38	996	2.65	1.01	0.38	1053	2.56	0.97	0.38	1072	2.47	0.94	0.38	1090
24	24	2.99	0.78	0.26	1034	2.81	0.73	0.26	1081	2.73	0.71	0.26	1105	2.65	0.69	0.26	1128
25	18	2.55	1.68	0.66	921	2.34	1.54	0.66	978	2.25	1.48	0.66	996	2.16	1.42	0.66	1015
25	20	2.68	1.45	0.54	959	2.50	1.35	0.54	1006	2.41	1.30	0.54	1034	2.31	1.25	0.54	1062
25	22	2.83	1.19	0.42	996	2.65	1.11	0.42	1053	2.56	1.08	0.42	1072	2.47	1.04	0.42	1090
25	24	2.99	0.90	0.30	1034	2.81	0.84	0.30	1081	2.73	0.82	0.30	1105	2.65	0.80	0.30	1128
26	18	2.55	1.78	0.70	921	2.34	1.64	0.70	978	2.25	1.57	0.70	996	2.16	1.51	0.70	1015
26	20	2.68	1.55	0.58	959	2.50	1.45	0.58	1006	2.41	1.39	0.58	1034	2.31	1.34	0.58	1062
26	22	2.83	1.30	0.46	996	2.65	1.22	0.46	1053	2.56	1.18	0.46	1072	2.47	1.14	0.46	1090
26	24	2.99	1.02	0.34	1034	2.81	0.95	0.34	1081	2.73	0.93	0.34	1105	2.65	0.90	0.34	1128
26	26	3.15	0.69	0.22	1072	2.96	0.65	0.22	1119	2.87	0.63	0.22	1142	2.78	0.61	0.22	1166
27	18	2.55	1.89	0.74	921	2.34	1.73	0.74	978	2.25	1.66	0.74	996	2.16	1.60	0.74	1015
27	20	2.68	1.66	0.62	959	2.50	1.55	0.62	1006	2.41	1.49	0.62	1034	2.31	1.43	0.62	1062
27	22	2.83	1.42	0.50	996	2.65	1.33	0.50	1053	2.56	1.28	0.50	1072	2.47	1.24	0.50	1090
27	24	2.99	1.14	0.38	1034	2.81	1.07	0.38	1081	2.73	1.04	0.38	1105	2.65	1.01	0.38	1128
27	26	3.15	0.82	0.26	1072	2.96	0.77	0.26	1119	2.87	0.75	0.26	1142	2.78	0.72	0.26	1166
28	18	2.55	1.99	0.78	921	2.34	1.83	0.78	978	2.25	1.75	0.78	996	2.16	1.68	0.78	1015
28	20	2.68	1.77	0.66	959	2.50	1.65	0.66	1006	2.41	1.59	0.66	1034	2.31	1.53	0.66	1062
28	22	2.83	1.53	0.54	996	2.65	1.43	0.54	1053	2.56	1.38	0.54	1072	2.47	1.33	0.54	1090
28	24	2.99	1.26	0.42	1034	2.81	1.18	0.42	1081	2.73	1.15	0.42	1105	2.65	1.11	0.42	1128
28	26	3.15	0.94	0.30	1072	2.96	0.89	0.30	1119	2.87	0.86	0.30	1142	2.78	0.83	0.30	1166
29	18	2.55	2.09	0.82	921	2.34	1.92	0.82	978	2.25	1.84	0.82	996	2.16	1.77	0.82	1015
29	20	2.68	1.87	0.70	959	2.50	1.75	0.70	1006	2.41	1.68	0.70	1034	2.31	1.62	0.70	1062
29	22	2.83	1.64	0.58	996	2.65	1.54	0.58	1053	2.56	1.49	0.58	1072	2.47	1.43	0.58	1090
29	24	2.99	1.38	0.46	1034	2.81	1.29	0.46	1081	2.73	1.26	0.46	1105	2.65	1.22	0.46	1128
29	26	3.15	1.07	0.34	1072	2.96	1.01	0.34	1119	2.87	0.98	0.34	1142	2.78	0.95	0.34	1166
30	18	2.55	2.19	0.86	921	2.34	2.01	0.86	978	2.25	1.93	0.86	996	2.16	1.86	0.86	1015
30	20	2.68	1.98	0.74	959	2.50	1.85	0.74	1006	2.41	1.78	0.74	1034	2.31	1.71	0.74	1062
30	22	2.83	1.76	0.62	996	2.65	1.64	0.62	1053	2.56	1.59	0.62	1072	2.47	1.53	0.62	1090
30	24	2.99	1.50	0.50	1034	2.81	1.40	0.50	1081	2.73	1.37	0.50	1105	2.65	1.33	0.50	1128
30	26	3.15	1.20	0.38	1072	2.96	1.13	0.38	1119	2.87	1.09	0.38	1142	2.78	1.06	0.38	1166
31	18	2.55	2.29	0.90	921	2.34	2.11	0.90	978	2.25	2.02	0.90	996	2.16	1.94	0.90	1015
31	20	2.68	2.09	0.78	959	2.50	1.95	0.78	1006	2.41	1.88	0.78	1034	2.31	1.80	0.78	1062
31	22	2.83	1.87	0.66	996	2.65	1.75	0.66	1053	2.56	1.69	0.66	1072	2.47	1.63	0.66	1090
31	24	2.99	1.61	0.54	1034	2.81	1.52	0.54	1081	2.73	1.47	0.54	1105	2.65	1.43	0.54	1128
31	26	3.15	1.32	0.42	1072	2.96	1.24	0.42	1119	2.87	1.21	0.42	1142	2.78	1.17	0.42	1166
32	18	2.55	2.40	0.94	921	2.34	2.20	0.94	978	2.25	2.11	0.94	996	2.16	2.03	0.94	1015
32	20	2.68	2.20	0.82	959	2.50	2.05	0.82	1006	2.41	1.97	0.82	1034	2.31	1.90	0.82	1062
32	22	2.83	1.98	0.70	996	2.65	1.86	0.70	1053	2.56	1.79	0.70	1072	2.47	1.73	0.70	1090
32	24	2.99	1.73	0.58	1034	2.81	1.63	0.58	1081	2.73	1.58	0.58	1105	2.65	1.54	0.58	1128
32	26	3.15	1.45	0.46	1072	2.96	1.36	0.46	1119	2.87	1.32	0.46	1142	2.78	1.28	0.46	1166

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation Rated frequency 85Hz

MSZ-G12SV -[E1] : MUZ-G12SV -[E1]

MSZ-G12SV -[E2] : MUZ-G12SV -[E2]

CAPACITY:3.5(KW) SHF:0.67 INPUT:1290(W)

		OUTDOOR DB(°C)															
INDOOR DB(°C)	INDOOR WB(°C)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.11	2.02	0.49	1032	3.94	1.93	0.49	1084	3.78	1.85	0.49	1135	3.64	1.78	0.49	1187
21	20	4.29	1.59	0.37	1084	4.11	1.52	0.37	1148	3.99	1.48	0.37	1174	3.85	1.42	0.37	1226
22	18	4.11	2.18	0.53	1032	3.94	2.09	0.53	1084	3.78	2.00	0.53	1135	3.64	1.93	0.53	1187
22	20	4.29	1.76	0.41	1084	4.11	1.69	0.41	1148	3.99	1.64	0.41	1174	3.85	1.58	0.41	1226
22	22	4.46	1.29	0.29	1122	4.31	1.25	0.29	1193	4.20	1.22	0.29	1226	4.03	1.17	0.29	1277
23	18	4.11	2.34	0.57	1032	3.94	2.24	0.57	1084	3.78	2.15	0.57	1135	3.64	2.07	0.57	1187
23	20	4.29	1.93	0.45	1084	4.11	1.85	0.45	1148	3.99	1.80	0.45	1174	3.85	1.73	0.45	1226
23	22	4.46	1.47	0.33	1122	4.31	1.42	0.33	1193	4.20	1.39	0.33	1226	4.03	1.33	0.33	1277
24	18	4.11	2.51	0.61	1032	3.94	2.40	0.61	1084	3.78	2.31	0.61	1135	3.64	2.22	0.61	1187
24	20	4.29	2.10	0.49	1084	4.11	2.02	0.49	1148	3.99	1.96	0.49	1174	3.85	1.89	0.49	1226
24	22	4.46	1.65	0.37	1122	4.31	1.59	0.37	1193	4.20	1.55	0.37	1226	4.03	1.49	0.37	1277
24	24	4.69	1.17	0.25	1174	4.52	1.13	0.25	1238	4.41	1.10	0.25	1277	4.27	1.07	0.25	1342
25	18	4.11	2.67	0.65	1032	3.94	2.56	0.65	1084	3.78	2.46	0.65	1135	3.64	2.37	0.65	1187
25	20	4.29	2.27	0.53	1084	4.11	2.18	0.53	1148	3.99	2.11	0.53	1174	3.85	2.04	0.53	1226
25	22	4.46	1.83	0.41	1122	4.31	1.77	0.41	1193	4.20	1.72	0.41	1226	4.03	1.65	0.41	1277
25	24	4.69	1.36	0.29	1174	4.52	1.31	0.29	1238	4.41	1.28	0.29	1277	4.27	1.24	0.29	1342
26	18	4.11	2.84	0.69	1032	3.94	2.72	0.69	1084	3.78	2.61	0.69	1135	3.64	2.51	0.69	1187
26	20	4.29	2.44	0.57	1084	4.11	2.34	0.57	1148	3.99	2.27	0.57	1174	3.85	2.19	0.57	1226
26	22	4.46	2.01	0.45	1122	4.31	1.94	0.45	1193	4.20	1.89	0.45	1226	4.03	1.81	0.45	1277
26	24	4.69	1.55	0.33	1174	4.52	1.49	0.33	1238	4.41	1.46	0.33	1277	4.27	1.41	0.33	1342
26	26	4.83	1.01	0.21	1238	4.69	0.98	0.21	1303	4.62	0.97	0.21	1342	4.48	0.94	0.21	1380
27	18	4.11	3.00	0.73	1032	3.94	2.87	0.73	1084	3.78	2.76	0.73	1135	3.64	2.66	0.73	1187
27	20	4.29	2.62	0.61	1084	4.11	2.51	0.61	1148	3.99	2.43	0.61	1174	3.85	2.35	0.61	1226
27	22	4.46	2.19	0.49	1122	4.31	2.11	0.49	1193	4.20	2.06	0.49	1226	4.03	1.97	0.49	1277
27	24	4.69	1.74	0.37	1174	4.52	1.67	0.37	1238	4.41	1.63	0.37	1277	4.27	1.58	0.37	1342
27	26	4.83	1.21	0.25	1238	4.69	1.17	0.25	1303	4.62	1.16	0.25	1342	4.48	1.12	0.25	1380
28	18	4.11	3.17	0.77	1032	3.94	3.03	0.77	1084	3.78	2.91	0.77	1135	3.64	2.80	0.77	1187
28	20	4.29	2.79	0.65	1084	4.11	2.67	0.65	1148	3.99	2.59	0.65	1174	3.85	2.50	0.65	1226
28	22	4.46	2.37	0.53	1122	4.31	2.28	0.53	1193	4.20	2.23	0.53	1226	4.03	2.13	0.53	1277
28	24	4.69	1.92	0.41	1174	4.52	1.85	0.41	1238	4.41	1.81	0.41	1277	4.27	1.75	0.41	1342
28	26	4.83	1.40	0.29	1238	4.69	1.36	0.29	1303	4.62	1.34	0.29	1342	4.48	1.30	0.29	1380
29	18	4.11	3.33	0.81	1032	3.94	3.19	0.81	1084	3.78	3.06	0.81	1135	3.64	2.95	0.81	1187
29	20	4.29	2.96	0.69	1084	4.11	2.84	0.69	1148	3.99	2.75	0.69	1174	3.85	2.66	0.69	1226
29	22	4.46	2.54	0.57	1122	4.31	2.45	0.57	1193	4.20	2.39	0.57	1226	4.03	2.29	0.57	1277
29	24	4.69	2.11	0.45	1174	4.52	2.03	0.45	1238	4.41	1.98	0.45	1277	4.27	1.92	0.45	1342
29	26	4.83	1.59	0.33	1238	4.69	1.55	0.33	1303	4.62	1.52	0.33	1342	4.48	1.48	0.33	1380
30	18	4.11	3.50	0.85	1032	3.94	3.35	0.85	1084	3.78	3.21	0.85	1135	3.64	3.09	0.85	1187
30	20	4.29	3.13	0.73	1084	4.11	3.00	0.73	1148	3.99	2.91	0.73	1174	3.85	2.81	0.73	1226
30	22	4.46	2.72	0.61	1122	4.31	2.63	0.61	1193	4.20	2.56	0.61	1226	4.03	2.46	0.61	1277
30	24	4.69	2.30	0.49	1174	4.52	2.21	0.49	1238	4.41	2.16	0.49	1277	4.27	2.09	0.49	1342
30	26	4.83	1.79	0.37	1238	4.69	1.74	0.37	1303	4.62	1.71	0.37	1342	4.48	1.66	0.37	1380
31	18	4.11	3.66	0.89	1032	3.94	3.50	0.89	1084	3.78	3.36	0.89	1135	3.64	3.24	0.89	1187
31	20	4.29	3.30	0.77	1084	4.11	3.17	0.77	1148	3.99	3.07	0.77	1174	3.85	2.96	0.77	1226
31	22	4.46	2.90	0.65	1122	4.31	2.80	0.65	1193	4.20	2.73	0.65	1226	4.03	2.62	0.65	1277
31	24	4.69	2.49	0.53	1174	4.52	2.39	0.53	1238	4.41	2.34	0.53	1277	4.27	2.26	0.53	1342
31	26	4.83	1.98	0.41	1238	4.69	1.92	0.41	1303	4.62	1.89	0.41	1342	4.48	1.84	0.41	1380
32	18	4.11	3.82	0.93	1032	3.94	3.66	0.93	1084	3.78	3.52	0.93	1135	3.64	3.39	0.93	1187
32	20	4.29	3.47	0.81	1084	4.11	3.33	0.81	1148	3.99	3.23	0.81	1174	3.85	3.12	0.81	1226
32	22	4.46	3.08	0.69	1122	4.31	2.97	0.69	1193	4.20	2.90	0.69	1226	4.03	2.78	0.69	1277
32	24	4.69	2.67	0.57	1174	4.52	2.57	0.57	1238	4.41	2.51	0.57	1277	4.27	2.43	0.57	1342
32	26	4.83	2.17	0.45	1238	4.69	2.11	0.45	1303	4.62	2.08	0.45	1342	4.48	2.02	0.45	1380

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation Rated frequency 85Hz

MSZ-G12SV -[E1] : MUZ-G12SV -[E1]

MSZ-G12SV -[E2] : MUZ-G12SV -[E2]

CAPACITY:3.5(KW) INPUT:1290(W) SHF:0.67

		OUTDOOR DB(°C)															
INDOOR DB(°C)	INDOOR WB(°C)	35				40				43				46			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.43	1.68	0.49	1264	3.15	1.54	0.49	1342	3.03	1.48	0.49	1367	2.91	1.42	0.49	1393
21	20	3.61	1.33	0.37	1316	3.36	1.24	0.37	1380	3.24	1.20	0.37	1419	3.12	1.15	0.37	1458
22	18	3.43	1.82	0.53	1264	3.15	1.67	0.53	1342	3.03	1.60	0.53	1367	2.91	1.54	0.53	1393
22	20	3.61	1.48	0.41	1316	3.36	1.38	0.41	1380	3.24	1.33	0.41	1419	3.12	1.28	0.41	1458
22	22	3.82	1.11	0.29	1367	3.57	1.04	0.29	1445	3.45	1.00	0.29	1471	3.33	0.96	0.29	1496
23	18	3.43	1.96	0.57	1264	3.15	1.80	0.57	1342	3.03	1.73	0.57	1367	2.91	1.66	0.57	1393
23	20	3.61	1.62	0.45	1316	3.36	1.51	0.45	1380	3.24	1.46	0.45	1419	3.12	1.40	0.45	1458
23	22	3.82	1.26	0.33	1367	3.57	1.18	0.33	1445	3.45	1.14	0.33	1471	3.33	1.10	0.33	1496
24	18	3.43	2.09	0.61	1264	3.15	1.92	0.61	1342	3.03	1.85	0.61	1367	2.91	1.77	0.61	1393
24	20	3.61	1.77	0.49	1316	3.36	1.65	0.49	1380	3.24	1.59	0.49	1419	3.12	1.53	0.49	1458
24	22	3.82	1.41	0.37	1367	3.57	1.32	0.37	1445	3.45	1.28	0.37	1471	3.33	1.23	0.37	1496
24	24	4.03	1.01	0.25	1419	3.78	0.95	0.25	1484	3.68	0.92	0.25	1516	3.57	0.89	0.25	1548
25	18	3.43	2.23	0.65	1264	3.15	2.05	0.65	1342	3.03	1.97	0.65	1367	2.91	1.89	0.65	1393
25	20	3.61	1.91	0.53	1316	3.36	1.78	0.53	1380	3.24	1.72	0.53	1419	3.12	1.65	0.53	1458
25	22	3.82	1.56	0.41	1367	3.57	1.46	0.41	1445	3.45	1.41	0.41	1471	3.33	1.36	0.41	1496
25	24	4.03	1.17	0.29	1419	3.78	1.10	0.29	1484	3.68	1.07	0.29	1516	3.57	1.04	0.29	1548
26	18	3.43	2.37	0.69	1264	3.15	2.17	0.69	1342	3.03	2.09	0.69	1367	2.91	2.00	0.69	1393
26	20	3.61	2.05	0.57	1316	3.36	1.92	0.57	1380	3.24	1.85	0.57	1419	3.12	1.78	0.57	1458
26	22	3.82	1.72	0.45	1367	3.57	1.61	0.45	1445	3.45	1.55	0.45	1471	3.33	1.50	0.45	1496
26	24	4.03	1.33	0.33	1419	3.78	1.25	0.33	1484	3.68	1.21	0.33	1516	3.57	1.18	0.33	1548
26	26	4.24	0.89	0.21	1471	3.99	0.84	0.21	1535	3.87	0.81	0.21	1567	3.75	0.79	0.21	1600
27	18	3.43	2.50	0.73	1264	3.15	2.30	0.73	1342	3.03	2.21	0.73	1367	2.91	2.12	0.73	1393
27	20	3.61	2.20	0.61	1316	3.36	2.05	0.61	1380	3.24	1.97	0.61	1419	3.12	1.90	0.61	1458
27	22	3.82	1.87	0.49	1367	3.57	1.75	0.49	1445	3.45	1.69	0.49	1471	3.33	1.63	0.49	1496
27	24	4.03	1.49	0.37	1419	3.78	1.40	0.37	1484	3.68	1.36	0.37	1516	3.57	1.32	0.37	1548
27	26	4.24	1.06	0.25	1471	3.99	1.00	0.25	1535	3.87	0.97	0.25	1567	3.75	0.94	0.25	1600
28	18	3.43	2.64	0.77	1264	3.15	2.43	0.77	1342	3.03	2.33	0.77	1367	2.91	2.24	0.77	1393
28	20	3.61	2.34	0.65	1316	3.36	2.18	0.65	1380	3.24	2.10	0.65	1419	3.12	2.02	0.65	1458
28	22	3.82	2.02	0.53	1367	3.57	1.89	0.53	1445	3.45	1.83	0.53	1471	3.33	1.76	0.53	1496
28	24	4.03	1.65	0.41	1419	3.78	1.55	0.41	1484	3.68	1.51	0.41	1516	3.57	1.46	0.41	1548
28	26	4.24	1.23	0.29	1471	3.99	1.16	0.29	1535	3.87	1.12	0.29	1567	3.75	1.09	0.29	1600
29	18	3.43	2.78	0.81	1264	3.15	2.55	0.81	1342	3.03	2.45	0.81	1367	2.91	2.35	0.81	1393
29	20	3.61	2.49	0.69	1316	3.36	2.32	0.69	1380	3.24	2.23	0.69	1419	3.12	2.15	0.69	1458
29	22	3.82	2.17	0.57	1367	3.57	2.03	0.57	1445	3.45	1.97	0.57	1471	3.33	1.90	0.57	1496
29	24	4.03	1.81	0.45	1419	3.78	1.70	0.45	1484	3.68	1.65	0.45	1516	3.57	1.61	0.45	1548
29	26	4.24	1.40	0.33	1471	3.99	1.32	0.33	1535	3.87	1.28	0.33	1567	3.75	1.24	0.33	1600
30	18	3.43	2.92	0.85	1264	3.15	2.68	0.85	1342	3.03	2.57	0.85	1367	2.91	2.47	0.85	1393
30	20	3.61	2.63	0.73	1316	3.36	2.45	0.73	1380	3.24	2.36	0.73	1419	3.12	2.27	0.73	1458
30	22	3.82	2.33	0.61	1367	3.57	2.18	0.61	1445	3.45	2.10	0.61	1471	3.33	2.03	0.61	1496
30	24	4.03	1.97	0.49	1419	3.78	1.85	0.49	1484	3.68	1.80	0.49	1516	3.57	1.75	0.49	1548
30	26	4.24	1.57	0.37	1471	3.99	1.48	0.37	1535	3.87	1.43	0.37	1567	3.75	1.39	0.37	1600
31	18	3.43	3.05	0.89	1264	3.15	2.80	0.89	1342	3.03	2.69	0.89	1367	2.91	2.59	0.89	1393
31	20	3.61	2.78	0.77	1316	3.36	2.59	0.77	1380	3.24	2.49	0.77	1419	3.12	2.40	0.77	1458
31	22	3.82	2.48	0.65	1367	3.57	2.32	0.65	1445	3.45	2.24	0.65	1471	3.33	2.16	0.65	1496
31	24	4.03	2.13	0.53	1419	3.78	2.00	0.53	1484	3.68	1.95	0.53	1516	3.57	1.89	0.53	1548
31	26	4.24	1.74	0.41	1471	3.99	1.64	0.41	1535	3.87	1.59	0.41	1567	3.75	1.54	0.41	1600
32	18	3.43	3.19	0.93	1264	3.15	2.93	0.93	1342	3.03	2.82	0.93	1367	2.91	2.70	0.93	1393
32	20	3.61	2.92	0.81	1316	3.36	2.72	0.81	1380	3.24	2.62	0.81	1419	3.12	2.52	0.81	1458
32	22	3.82	2.63	0.69	1367	3.57	2.46	0.69	1445	3.45	2.38	0.69	1471	3.33	2.29	0.69	1496
32	24	4.03	2.29	0.57	1419	3.78	2.15	0.57	1484	3.68	2.09	0.57	1516	3.57	2.03	0.57	1548
32	26	4.24	1.91	0.45	1471	3.99	1.80	0.45	1535	3.87	1.74	0.45	1567	3.75	1.69	0.45	1600

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation Rated frequency 120Hz

MSZ-G20SV -[E1] : MUZ-G20SV -[E1]

CAPACITY:5.3(KW) INPUT:2320(W) SHF:0.78

INDOOR DB(°C)	INDOOR WB(°C)	OUTDOOR DB(°C)															
		21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	6.23	3.74	0.60	1856	5.96	3.58	0.60	1949	5.72	3.43	0.60	2042	5.51	3.31	0.60	2134
21	20	6.49	3.12	0.48	1949	6.23	2.99	0.48	2065	6.04	2.90	0.48	2111	5.83	2.80	0.48	2204
22	18	6.23	3.99	0.64	1856	5.96	3.82	0.64	1949	5.72	3.66	0.64	2042	5.51	3.53	0.64	2134
22	20	6.49	3.38	0.52	1949	6.23	3.24	0.52	2065	6.04	3.14	0.52	2111	5.83	3.03	0.52	2204
22	22	6.76	2.70	0.40	2018	6.52	2.61	0.40	2146	6.36	2.54	0.40	2204	6.10	2.44	0.40	2297
23	18	6.23	4.23	0.68	1856	5.96	4.05	0.68	1949	5.72	3.89	0.68	2042	5.51	3.75	0.68	2134
23	20	6.49	3.64	0.56	1949	6.23	3.49	0.56	2065	6.04	3.38	0.56	2111	5.83	3.26	0.56	2204
23	22	6.76	2.97	0.44	2018	6.52	2.87	0.44	2146	6.36	2.80	0.44	2204	6.10	2.68	0.44	2297
24	18	6.23	4.48	0.72	1856	5.96	4.29	0.72	1949	5.72	4.12	0.72	2042	5.51	3.97	0.72	2134
24	20	6.49	3.90	0.60	1949	6.23	3.74	0.60	2065	6.04	3.63	0.60	2111	5.83	3.50	0.60	2204
24	22	6.76	3.24	0.48	2018	6.52	3.13	0.48	2146	6.36	3.05	0.48	2204	6.10	2.93	0.48	2297
24	24	7.10	2.56	0.36	2111	6.84	2.46	0.36	2227	6.68	2.40	0.36	2297	6.47	2.33	0.36	2413
25	18	6.23	4.73	0.76	1856	5.96	4.53	0.76	1949	5.72	4.35	0.76	2042	5.51	4.19	0.76	2134
25	20	6.49	4.16	0.64	1949	6.23	3.99	0.64	2065	6.04	3.87	0.64	2111	5.83	3.73	0.64	2204
25	22	6.76	3.51	0.52	2018	6.52	3.39	0.52	2146	6.36	3.31	0.52	2204	6.10	3.17	0.52	2297
25	24	7.10	2.84	0.40	2111	6.84	2.73	0.40	2227	6.68	2.67	0.40	2297	6.47	2.59	0.40	2413
26	18	6.23	4.98	0.80	1856	5.96	4.77	0.80	1949	5.72	4.58	0.80	2042	5.51	4.41	0.80	2134
26	20	6.49	4.41	0.68	1949	6.23	4.23	0.68	2065	6.04	4.11	0.68	2111	5.83	3.96	0.68	2204
26	22	6.76	3.78	0.56	2018	6.52	3.65	0.56	2146	6.36	3.56	0.56	2204	6.10	3.41	0.56	2297
26	24	7.10	3.12	0.44	2111	6.84	3.01	0.44	2227	6.68	2.94	0.44	2297	6.47	2.85	0.44	2413
26	26	7.31	2.34	0.32	2227	7.10	2.27	0.32	2343	7.00	2.24	0.32	2413	6.78	2.17	0.32	2482
27	18	6.23	5.23	0.84	1856	5.96	5.01	0.84	1949	5.72	4.81	0.84	2042	5.51	4.63	0.84	2134
27	20	6.49	4.67	0.72	1949	6.23	4.48	0.72	2065	6.04	4.35	0.72	2111	5.83	4.20	0.72	2204
27	22	6.76	4.05	0.60	2018	6.52	3.91	0.60	2146	6.36	3.82	0.60	2204	6.10	3.66	0.60	2297
27	24	7.10	3.41	0.48	2111	6.84	3.28	0.48	2227	6.68	3.21	0.48	2297	6.47	3.10	0.48	2413
27	26	7.31	2.63	0.36	2227	7.10	2.56	0.36	2343	7.00	2.52	0.36	2413	6.78	2.44	0.36	2482
28	18	6.23	5.48	0.88	1856	5.96	5.25	0.88	1949	5.72	5.04	0.88	2042	5.51	4.85	0.88	2134
28	20	6.49	4.93	0.76	1949	6.23	4.73	0.76	2065	6.04	4.59	0.76	2111	5.83	4.43	0.76	2204
28	22	6.76	4.32	0.64	2018	6.52	4.17	0.64	2146	6.36	4.07	0.64	2204	6.10	3.90	0.64	2297
28	24	7.10	3.69	0.52	2111	6.84	3.56	0.52	2227	6.68	3.47	0.52	2297	6.47	3.36	0.52	2413
28	26	7.31	2.93	0.40	2227	7.10	2.84	0.40	2343	7.00	2.80	0.40	2413	6.78	2.71	0.40	2482
29	18	6.23	5.73	0.92	1856	5.96	5.49	0.92	1949	5.72	5.27	0.92	2042	5.51	5.07	0.92	2134
29	20	6.49	5.19	0.80	1949	6.23	4.98	0.80	2065	6.04	4.83	0.80	2111	5.83	4.66	0.80	2204
29	22	6.76	4.60	0.68	2018	6.52	4.43	0.68	2146	6.36	4.32	0.68	2204	6.10	4.14	0.68	2297
29	24	7.10	3.98	0.56	2111	6.84	3.83	0.56	2227	6.68	3.74	0.56	2297	6.47	3.62	0.56	2413
29	26	7.31	3.22	0.44	2227	7.10	3.12	0.44	2343	7.00	3.08	0.44	2413	6.78	2.98	0.44	2482
30	18	6.23	5.98	0.96	1856	5.96	5.72	0.96	1949	5.72	5.50	0.96	2042	5.51	5.29	0.96	2134
30	20	6.49	5.45	0.84	1949	6.23	5.23	0.84	2065	6.04	5.08	0.84	2111	5.83	4.90	0.84	2204
30	22	6.76	4.87	0.72	2018	6.52	4.69	0.72	2146	6.36	4.58	0.72	2204	6.10	4.39	0.72	2297
30	24	7.10	4.26	0.60	2111	6.84	4.10	0.60	2227	6.68	4.01	0.60	2297	6.47	3.88	0.60	2413
30	26	7.31	3.51	0.48	2227	7.10	3.41	0.48	2343	7.00	3.36	0.48	2413	6.78	3.26	0.48	2482
31	18	6.23	6.23	1.00	1856	5.96	5.96	1.00	1949	5.72	5.72	1.00	2042	5.51	5.51	1.00	2134
31	20	6.49	5.71	0.88	1949	6.23	5.48	0.88	2065	6.04	5.32	0.88	2111	5.83	5.13	0.88	2204
31	22	6.76	5.14	0.76	2018	6.52	4.95	0.76	2146	6.36	4.83	0.76	2204	6.10	4.63	0.76	2297
31	24	7.10	4.55	0.64	2111	6.84	4.38	0.64	2227	6.68	4.27	0.64	2297	6.47	4.14	0.64	2413
31	26	7.31	3.80	0.52	2227	7.10	3.69	0.52	2343	7.00	3.64	0.52	2413	6.78	3.53	0.52	2482
32	18	6.23	6.48	1.04	1856	5.96	6.20	1.04	1949	5.72	5.95	1.04	2042	5.51	5.73	1.04	2134
32	20	6.49	5.97	0.92	1949	6.23	5.73	0.92	2065	6.04	5.56	0.92	2111	5.83	5.36	0.92	2204
32	22	6.76	5.41	0.80	2018	6.52	5.22	0.80	2146	6.36	5.09	0.80	2204	6.10	4.88	0.80	2297
32	24	7.10	4.83	0.68	2111	6.84	4.65	0.68	2227	6.68	4.54	0.68	2297	6.47	4.40	0.68	2413
32	26	7.31	4.10	0.56	2227	7.10	3.98	0.56	2343	7.00	3.92	0.56	2413	6.78	3.80	0.56	2482

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation Rated frequency 120Hz

MSZ-G20SV -[E1] : MUZ-G20SV -[E1]

CAPACITY:5.3(KW) INPUT:2320(W) SHF:0.78

		OUTDOOR DB(°C)															
INDOOR DB(°C)	INDOOR WB(°C)	35				40				43				46			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	5.19	3.12	0.60	2274	4.77	2.86	0.60	2413	4.58	2.75	0.60	2459	4.40	2.64	0.60	2506
21	20	5.46	2.62	0.48	2366	5.09	2.44	0.48	2482	4.90	2.35	0.48	2552	4.72	2.26	0.48	2622
22	18	5.19	3.32	0.64	2274	4.77	3.05	0.64	2413	4.58	2.93	0.64	2459	4.40	2.82	0.64	2506
22	20	5.46	2.84	0.52	2366	5.09	2.65	0.52	2482	4.90	2.55	0.52	2552	4.72	2.45	0.52	2622
22	22	5.78	2.31	0.40	2459	5.41	2.16	0.40	2598	5.22	2.09	0.40	2645	5.04	2.01	0.40	2691
23	18	5.19	3.53	0.68	2274	4.77	3.24	0.68	2413	4.58	3.12	0.68	2459	4.40	2.99	0.68	2506
23	20	5.46	3.06	0.56	2366	5.09	2.85	0.56	2482	4.90	2.75	0.56	2552	4.72	2.64	0.56	2622
23	22	5.78	2.54	0.44	2459	5.41	2.38	0.44	2598	5.22	2.30	0.44	2645	5.04	2.22	0.44	2691
24	18	5.19	3.74	0.72	2274	4.77	3.43	0.72	2413	4.58	3.30	0.72	2459	4.40	3.17	0.72	2506
24	20	5.46	3.28	0.60	2366	5.09	3.05	0.60	2482	4.90	2.94	0.60	2552	4.72	2.83	0.60	2622
24	22	5.78	2.77	0.48	2459	5.41	2.59	0.48	2598	5.22	2.51	0.48	2645	5.04	2.42	0.48	2691
24	24	6.10	2.19	0.36	2552	5.72	2.06	0.36	2668	5.57	2.00	0.36	2726	5.41	1.95	0.36	2784
25	18	5.19	3.95	0.76	2274	4.77	3.63	0.76	2413	4.58	3.48	0.76	2459	4.40	3.34	0.76	2506
25	20	5.46	3.49	0.64	2366	5.09	3.26	0.64	2482	4.90	3.14	0.64	2552	4.72	3.02	0.64	2622
25	22	5.78	3.00	0.52	2459	5.41	2.81	0.52	2598	5.22	2.71	0.52	2645	5.04	2.62	0.52	2691
25	24	6.10	2.44	0.40	2552	5.72	2.29	0.40	2668	5.57	2.23	0.40	2726	5.41	2.16	0.40	2784
26	18	5.19	4.16	0.80	2274	4.77	3.82	0.80	2413	4.58	3.67	0.80	2459	4.40	3.52	0.80	2506
26	20	5.46	3.71	0.68	2366	5.09	3.46	0.68	2482	4.90	3.33	0.68	2552	4.72	3.21	0.68	2622
26	22	5.78	3.24	0.56	2459	5.41	3.03	0.56	2598	5.22	2.92	0.56	2645	5.04	2.82	0.56	2691
26	24	6.10	2.68	0.44	2552	5.72	2.52	0.44	2668	5.57	2.45	0.44	2726	5.41	2.38	0.44	2784
26	26	6.41	2.05	0.32	2645	6.04	1.93	0.32	2761	5.86	1.87	0.32	2819	5.67	1.81	0.32	2877
27	18	5.19	4.36	0.84	2274	4.77	4.01	0.84	2413	4.58	3.85	0.84	2459	4.40	3.70	0.84	2506
27	20	5.46	3.93	0.72	2366	5.09	3.66	0.72	2482	4.90	3.53	0.72	2552	4.72	3.40	0.72	2622
27	22	5.78	3.47	0.60	2459	5.41	3.24	0.60	2598	5.22	3.13	0.60	2645	5.04	3.02	0.60	2691
27	24	6.10	2.93	0.48	2552	5.72	2.75	0.48	2668	5.57	2.67	0.48	2726	5.41	2.59	0.48	2784
27	26	6.41	2.31	0.36	2645	6.04	2.18	0.36	2761	5.86	2.11	0.36	2819	5.67	2.04	0.36	2877
28	18	5.19	4.57	0.88	2274	4.77	4.20	0.88	2413	4.58	4.03	0.88	2459	4.40	3.87	0.88	2506
28	20	5.46	4.15	0.76	2366	5.09	3.87	0.76	2482	4.90	3.73	0.76	2552	4.72	3.58	0.76	2622
28	22	5.78	3.70	0.64	2459	5.41	3.46	0.64	2598	5.22	3.34	0.64	2645	5.04	3.22	0.64	2691
28	24	6.10	3.17	0.52	2552	5.72	2.98	0.52	2668	5.57	2.89	0.52	2726	5.41	2.81	0.52	2784
28	26	6.41	2.57	0.40	2645	6.04	2.42	0.40	2761	5.86	2.34	0.40	2819	5.67	2.27	0.40	2877
29	18	5.19	4.78	0.92	2274	4.77	4.39	0.92	2413	4.58	4.22	0.92	2459	4.40	4.05	0.92	2506
29	20	5.46	4.37	0.80	2366	5.09	4.07	0.80	2482	4.90	3.92	0.80	2552	4.72	3.77	0.80	2622
29	22	5.78	3.93	0.68	2459	5.41	3.68	0.68	2598	5.22	3.55	0.68	2645	5.04	3.42	0.68	2691
29	24	6.10	3.41	0.56	2552	5.72	3.21	0.56	2668	5.57	3.12	0.56	2726	5.41	3.03	0.56	2784
29	26	6.41	2.82	0.44	2645	6.04	2.66	0.44	2761	5.86	2.58	0.44	2819	5.67	2.50	0.44	2877
30	18	5.19	4.99	0.96	2274	4.77	4.58	0.96	2413	4.58	4.40	0.96	2459	4.40	4.22	0.96	2506
30	20	5.46	4.59	0.84	2366	5.09	4.27	0.84	2482	4.90	4.12	0.84	2552	4.72	3.96	0.84	2622
30	22	5.78	4.16	0.72	2459	5.41	3.89	0.72	2598	5.22	3.76	0.72	2645	5.04	3.63	0.72	2691
30	24	6.10	3.66	0.60	2552	5.72	3.43	0.60	2668	5.57	3.34	0.60	2726	5.41	3.24	0.60	2784
30	26	6.41	3.08	0.48	2645	6.04	2.90	0.48	2761	5.86	2.81	0.48	2819	5.67	2.72	0.48	2877
31	18	5.19	5.19	1.00	2274	4.77	4.77	1.00	2413	4.58	4.58	1.00	2459	4.40	4.40	1.00	2506
31	20	5.46	4.80	0.88	2366	5.09	4.48	0.88	2482	4.90	4.31	0.88	2552	4.72	4.15	0.88	2622
31	22	5.78	4.39	0.76	2459	5.41	4.11	0.76	2598	5.22	3.97	0.76	2645	5.04	3.83	0.76	2691
31	24	6.10	3.90	0.64	2552	5.72	3.66	0.64	2668	5.57	3.56	0.64	2726	5.41	3.46	0.64	2784
31	26	6.41	3.33	0.52	2645	6.04	3.14	0.52	2761	5.86	3.05	0.52	2819	5.67	2.95	0.52	2877
32	18	5.19	5.40	1.04	2274	4.77	4.96	1.04	2413	4.58	4.77	1.04	2459	4.40	4.57	1.04	2506
32	20	5.46	5.02	0.92	2366	5.09	4.68	0.92	2482	4.90	4.51	0.92	2552	4.72	4.34	0.92	2622
32	22	5.78	4.62	0.80	2459	5.41	4.32	0.80	2598	5.22	4.18	0.80	2645	5.04	4.03	0.80	2691
32	24	6.10	4.14	0.68	2552	5.72	3.89	0.68	2668	5.57	3.78	0.68	2726	5.41	3.68	0.68	2784
32	26	6.41	3.59	0.56	2645	6.04	3.38	0.56	2761	5.86	3.28	0.56	2819	5.67	3.18	0.56	2877

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA HEAT operation

MSZ-G09SV -[E1] : MUZ-G09SV -[E1]

MSZ-G09SV -[E2] : MUZ-G09SV -[E2] Rated frequency 95Hz

CAPACITY:3.6(KW) INPUT:1140(W)

INDOOR DB(°C)	OUTDOOR WB(°C)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.27	741	2.74	889	3.20	1003	3.67	1083	4.14	1151	4.57	1186	5.04	1208
21	2.16	798	2.59	946	3.06	1049	3.49	1129	3.96	1186	4.39	1220	4.84	1265
26	1.94	855	2.41	1003	2.84	1106	3.31	1186	3.78	1243	4.21	1277	4.68	1311

MSZ-G12SV -[E1] : MUZ-G12SV -[E1]

MSZ-G12SV -[E2] : MUZ-G12SV -[E2] Rated frequency 96Hz

CAPACITY:4.8(KW) INPUT:1540(W)

INDOOR DB(°C)	OUTDOOR WB(°C)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	3.02	1001	3.65	1201	4.27	1355	4.90	1463	5.52	1555	6.10	1602	6.72	1632
21	2.88	1078	3.46	1278	4.08	1417	4.66	1525	5.28	1602	5.86	1648	6.46	1709
26	2.59	1155	3.22	1355	3.79	1494	4.42	1602	5.04	1679	5.62	1725	6.24	1771

MSZ-G20SV -[E1] : MUZ-G20SV -[E1] Rated frequency 120Hz

CAPACITY:6.1(KW) INPUT:1930(W)

INDOOR DB(°C)	OUTDOOR WB(°C)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	3.84	1255	4.64	1505	5.43	1698	6.22	1834	7.02	1949	7.75	2007	8.54	2046
21	3.66	1351	4.39	1602	5.19	1776	5.92	1911	6.71	2007	7.44	2065	8.20	2142
26	3.29	1448	4.09	1698	4.82	1872	5.61	2007	6.41	2104	7.14	2162	7.93	2220

NOTE Q:Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature WB : Wet-bulb temperature

MSZ-G09SV -[E1] MSZ-G12SV -[E1] MUZ-G09SV -[E1] MUZ-G12SV -[E1]

MSZ-G09SV -[E2] MSZ-G12SV -[E2] MUZ-G09SV -[E2] MUZ-G12SV -[E2]

9-1. on page 35 ~ 9-13. on page 47

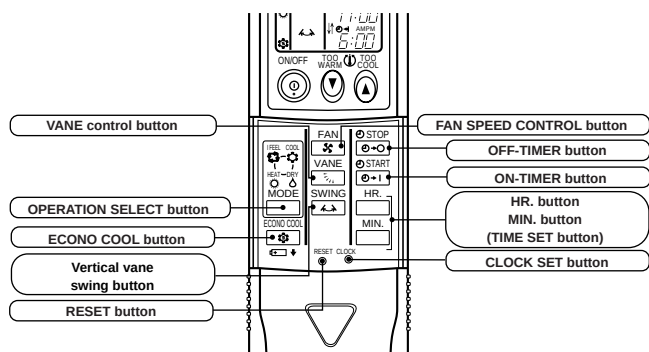
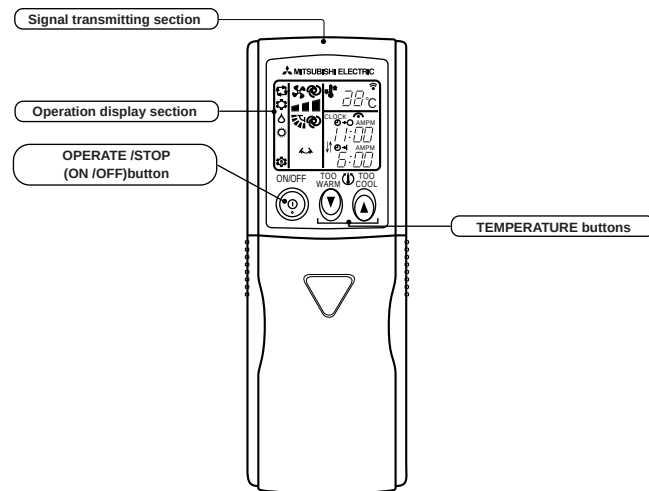
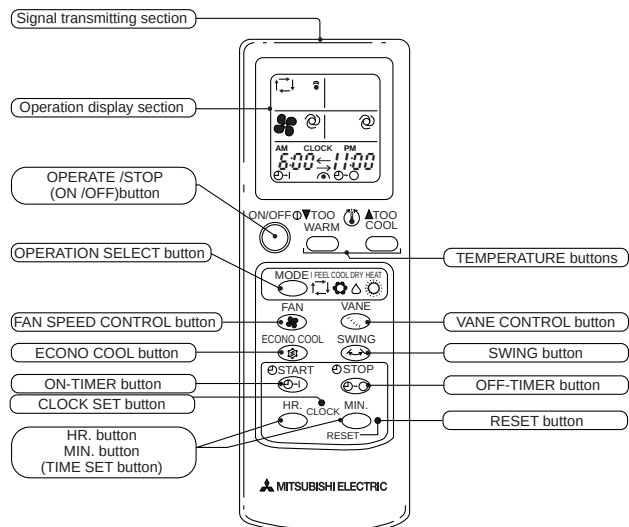
WIRELESS REMOTE CONTROLLER

MSZ-G09SV -[E1]

MSZ-G12SV -[E1]

MSZ-G09SV -[E2]

MSZ-G12SV -[E2]

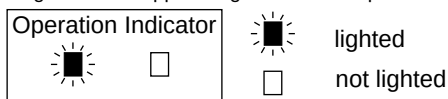


INDOOR UNIT DISPLAY SECTION

Operation Indicator lamp

The operation indicator at the right side of the indoor unit indicates the operation state.

•The following indication applies regardless of shape of the indicator.



Indication	Operation state	Difference between target temperature and room temperature
	This shows that the air conditioner is operating to reach the target temperature. Please wait until the target temperature is obtained.	Approx. 2 °C or more
	This shows that the room temperature is approaching the target temperature.	Approx. 2 °C or less

Once the operation mode are set, the same operation mode can be repeated by simply turning the OPERATE/STOP(ON/OFF) button ON.

Indoor unit receives the signal with a beep tone.

When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

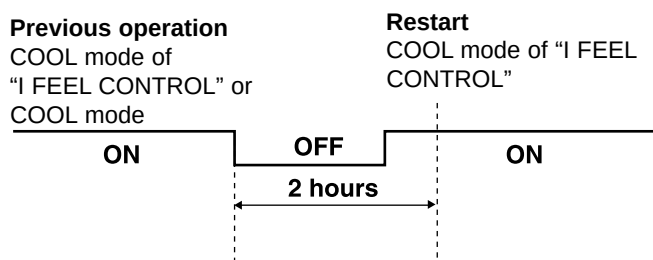
9-1. "I FEEL CONTROL" (□) OPERATION

1. Press OPERATE/STOP(ON/OFF) button on the remote controller. OPERATION INDICATOR lamp of the indoor unit will turn on with a beep tone.
2. Select "I FEEL CONTROL"(□) mode with the OPERATION SELECT button.
3. The operation mode is determined by the room temperature at start-up of the operation.

Initial room temperature	Mode
25°C or more	COOL mode of "I FEEL CONTROL"
23°C to 25°C	DRY mode of "I FEEL CONTROL"
less than 23°C	HEAT mode of "I FEEL CONTROL"

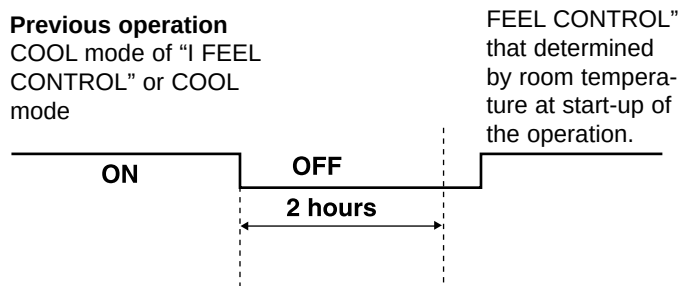
- Once the mode is fixed, the mode does not change by room temperature afterwards.
- Under the ON-TIMER (☹-|) operation, mode is determined according to the room temperature at set time the operation starts.
- When the system is stopped on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" (☐) mode, the system operates in previous mode automatically regardless of the room temperature.

Example



When the system is restarted after 2 hours and more, the operation mode is determined by the room temperature at start-up of the operation.

Example



4. The initial set temperature is decided by the initial room temperature.

Model	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	26℃ or more	24℃	※1
	26℃ to 26℃	Initial room temperature minus 2℃	
DRY mode of "I FEEL CONTROL"	23℃ to 25℃	Initial room temperature minus 2℃	
HEAT mode of "I FEEL CONTROL"	less than 23℃	26℃	

※1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of the room temperature at restart.

The set temperature is calculated by the previous set temperature.

5. TEMPERATURE buttons

In "I FEEL CONTROL" (☐) mode, set temperature is decided by the microprocessor based on the room temperature. In addition, set temperature can be controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm. Each time the TOO WARM or TOO COOL button is speed, the indoor unit receives the signal emits a beep tone.

● Fuzzy control

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.

In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.

▲ TOO

COOL (MSZ-G09/12SV -[E1]) /  (MSZ-G09/12SV -[E2]) ...To raise the set temperature 1 ~ 2 degrees (°C)

▼ TOO

WARM (MSZ-G09/12SV -[E1]) /  (MSZ-G09/12SV -[E2]) ... To lower the set temperature 1 ~ 2 degrees (°C)

9-1-1. Cool mode of "I FEEL CONTROL"

1. Indoor fan speed control

Indoor fan operates continuously at the set speed by FAN SPEED CONTROL button regardless of the thermostat's OFF-ON.

In AUTO the fan speed is as follows.

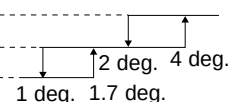
<MSZ-09SV -[E1], MSZ-G12SV -[E1]>

Room temperature minus set temperature: 2 degrees or moreover.....High

Room temperature minus set temperature: Between 1 and 2 degrees Med.

Room temperature minus set temperature: less than 1 degree.....Low

Difference between room temperature and set temperature during operation.

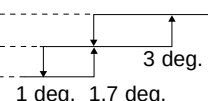


<MSZ-09SV -[E2], MSZ-G12SV -[E2]>

Room temperature minus set temperature : 1.7 degrees or more High

Room temperature minus set temperature : Between 1 and 1.7 degrees Med.

Room temperature minus set temperature : less than 1 degree Low



2. Coil frost prevention

① Temperature control

The operational frequency of the compressor is controlled based on the temperature of the indoor coil thermistor(RT12).

Temperature of indoor coil thermistor:RT12	Operation frequency
Approx. 8°C or above	Normal
Approx. 6°C to 8°C	Fixed
Approx. 4°C to 6°C	Lower at the rate of 3Hz/min.
Approx. 4°C or below	Lower at the rate of 6Hz/min Compressor is turned OFF for 5 minutes when temperature of indoor coil thermistor continues approx. 4°C or below for 5 minutes or more.

The indoor fan maintains the actual speed of the moment.

② Time control

When the three conditions as follows have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.

The indoor fan operates at set speed.

a. Compressor has been continuously operating.

b. Indoor fan speed is Low or Med.

c. Room temperature is below 26°C.

When compressor stops, the accumulated time is cancelled. When compressor restarts, time counting starts from the beginning.

Time counting also stops temporarily when the indoor fan speed becomes High or the room temperature exceeds 26°C.

However, when two of the above conditions(b and c.) are satisfied again. Time accumulation is resumed.

9-1-2. DRY mode of "I FEEL CONTROL"

The system for dry operation uses the same refrigerant circuit as the cooling circuit.

The compressor and the indoor fan are controlled by the room temperature.

By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.

1. Indoor fan speed control.

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

In Auto fan speed becomes Very Low.

2. The operation of the compressor and indoor fan/ outdoor fan

Compressor operates by temperature control and time control.

① Set temperature is controlled to fall 2°C from initial set temperature.

② Indoor fan and outdoor fan operate in the same cycle as the compressor.

③ Operational frequency of compressor during operation is fixed to G09:45Hz / G12:30Hz.

NOTE ● Coil frost prevention during DRY mode of "I FEEL CONTROL"

The operation is same as coil frost prevention during COOL mode of "I FEEL CONTROL" .

3. Coil frost prevention

The operational frequency of the compressor is controlled based on the temperature of the indoor coil thermistor (RT12).

Temperature of indoor coil thermistor:RT12	Operation frequency
Approx. 8°C or above	Normal
Approx. 6°C to 8°C	Fixed
Approx. 4°C to 6°C	Lower at the rate of 3Hz/min.
Approx. 4°C or below	Lower at the rate of 6Hz/min. Compressor is turned OFF for 5 minutes when temperature of indoor coil thermistor continues approx. 4°C or below for 5 minutes or more.

The indoor fan maintains the actual speed of the moment. However, when coil frost prevention works while the compressor is not operating, it's speed becomes the set speed.

9-1-3. HEAT mode of "I FEEL CONTROL"

1. Indoor fan speed control

(1) Indoor fan operates at the set speed by FAN SPEED CONTROL button.

In Auto the fan speed is as follows.

Initial temperature difference	Fan speed	Difference between room temperature and set temperature during operation
Set temperature minus room temperature: 2 degrees or more	High	2 deg. 4 deg.
Set temperature minus room temperature: Between 1 and 2 degrees	Med.	1 deg. 1.7 deg.
Set temperature minus room temperature: less than 1 degree	Low	

(2) Cold air prevention control

① When the compressor is not operating,

(I) if the temperature of indoor coil thermistor RT12 is 18°C or less, the fan stops.

(II) if the temperature of indoor coil thermistor RT12 is more than 18°C, the fan operates at Very Low.

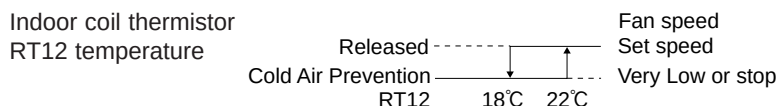
② When the compressor is operating,

(I) if the temperature of RT12 is 22°C or more, the fan operates at set speed.

(II) if the temperature of RT12 is less than 22°C and

(i) if the temperature of room temperature thermistor RT11 is 15°C or less, the fan stops.

(ii) if the temperature of room temperature thermistor RT11 is more than 15°C, the fan operates at Very Low.



NOTE : If the temperature of RT12 reads from 18°C to 22°C at the air conditioner starting and also after defrosting, this control works.

(3) Warm air control.

When the following any condition of ① (a. ~ d.) and the condition of ② are satisfied at the same time, warm air control works.

① a.) when the operation mode has been changed to HEAT mode

b.) when cold air prevention has been released

c.) when defrosting has been finished

d.) when the compressor starts in HEAT mode

② When the temperature of indoor coil thermistor RT12 is less than 37°C.

When warm air control works, the fan speed changes as follows to blow out warm air gradually.

Gradation of fan speed in initial

<Time condition>	<Indoor fan speed>
less than 2 minutes	Low
2 minutes to 4 minutes	Med.
more than 4 minutes	High

The upper limit of the fan speed in MANUAL is the set speed.

The upper limit of the fan speed in AUTO is the speed decided by indoor fan speed control.

When the temperature of RT12 has been 37°C or more, or when the set speed has been changed, this control is released and the fan speed is the set speed.

(4) Flow soft control

When the thermostat (compressor) is off, the indoor fan operates as follows.

Compressor	Fan
OFF	Very Low
ON	Set speed

NOTE : When the thermostat(compressor) turns on, the fan will operate at set speed. But until cold air prevention and warm air control is released, the fan speed follow them.

2. High pressure protection

In HEAT mode the indoor coil thermistor detects the temperature at the indoor heat exchanger and controls the compressor operational frequency to prevent the condensing pressure from increasing excessively.

3. Overload starting

When the room temperature thermistor reads 18°C or above, the compressor runs with its maximum frequency regulated for 3 minutes after the start-up.

4. Defrosting

(1) Starting conditions of defrosting

When the following three conditions, a), b), and c), are satisfied, the defrosting starts.

a) The defrost thermistor reads -3°C or below.

b) The cumulative operation time of the compressor has reached any of the set values: 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105 minutes.

c) More than 5 minutes have passed since the start-up of the compressor.

※ Set value of compressor operation time(hereinafter referred to as defrost interval)

The first defrost interval is 32 minutes long, and the second 35 minutes long. The third and subsequent intervals are set to be longer, and less frequent, depending on defrosting time.

The third and subsequent defrost intervals follow any of the three patterns ...5 or 10 minutes longer, the same, or 5 or 10 minutes shorter compared with the previous defrost interval ... with the longest 115 minutes and the shortest 30 minutes.

(2) Releasing conditions of defrosting

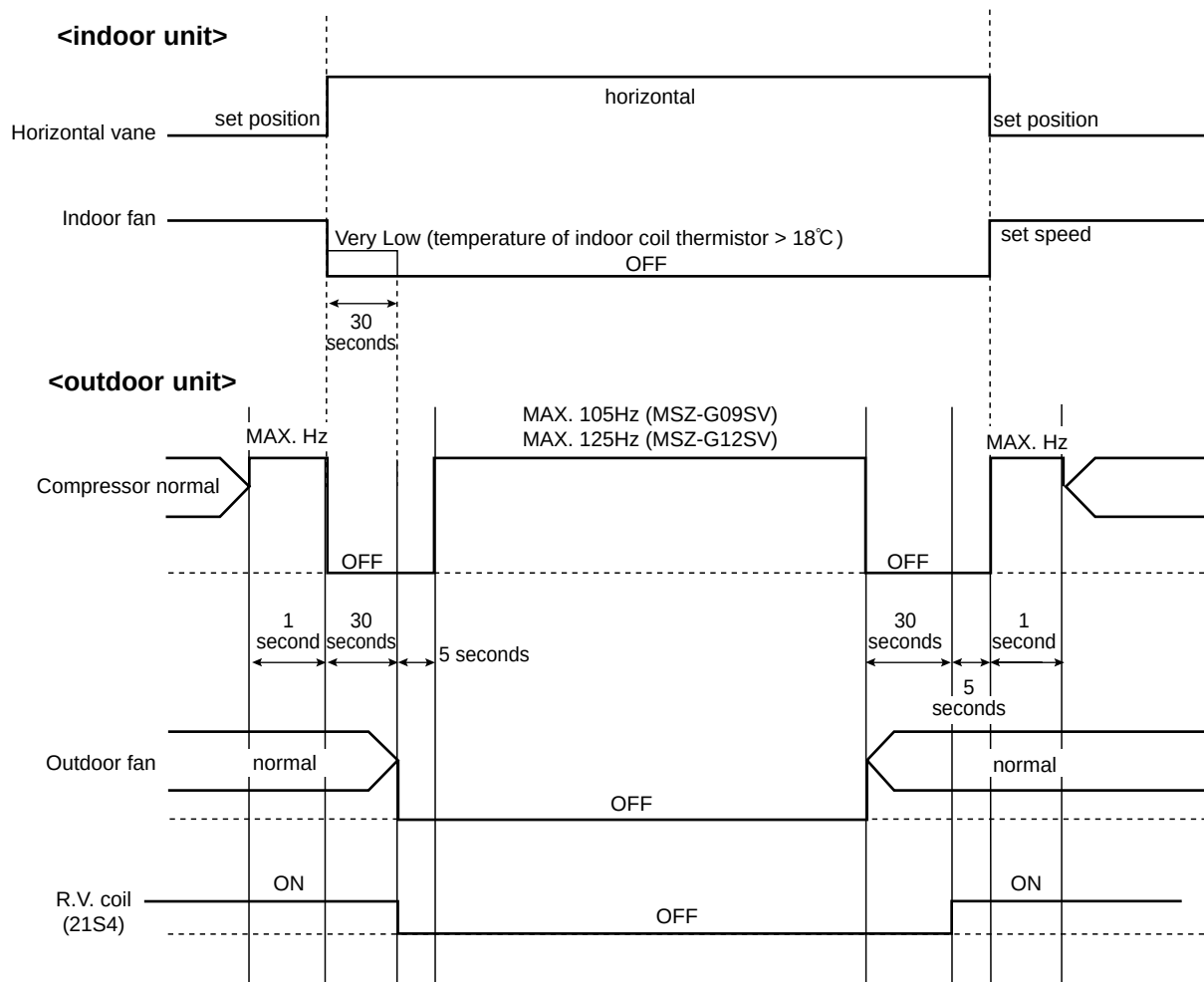
Defrosting is released when any of the following condition is satisfied:

a) The defrost thermistor reads 13°C or above.

b) Defrosting time has exceeded 10 minutes.

c) Some other modes than HEAT mode is set during defrosting.

Time chart of defrosting in HEAT mode (reverse type)

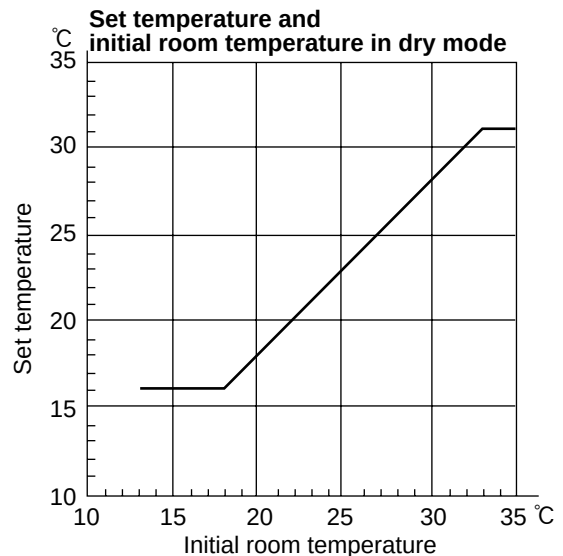


9-2. COOL (❄) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- (2) Select COOL mode with the OPERATION SELECT button.
- (3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C
* Indoor fan continues to operate regardless of thermostat's OFF-ON
* Coil frost prevention is same as COOL mode of "I FEEL CONTROL"

9-3. DRY (☁) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- (2) Select DRY mode with the OPERATION SELECT button.
- (3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
- (4) DRY operation will not function when the room temperature is 13°C or below.



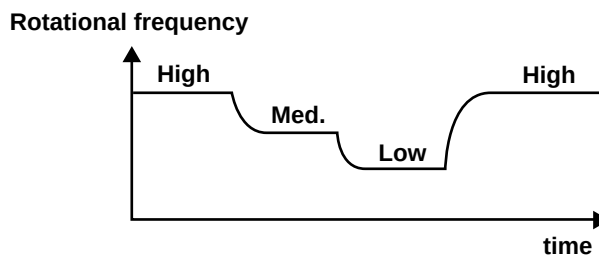
9-4. HEAT (☀) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- (2) Select HEAT mode with the OPERATION SELECT button.
- (3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C.
- (4) Indoor fan speed control, high pressure protection, defrosting, R.V. coil control are the same as HEAT mode of "I FEEL CONTROL"

9-5. FAN MOTOR CONTROL

1. Rotational frequency feedback control

The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feed-back the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (High, Med., Low) the microprocessor controls SR141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.



2. Fan motor lock-up protection

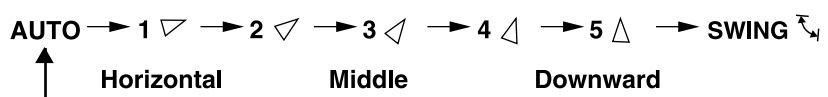
When the rotational frequency feedback signal is not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the OPERATION INDICATOR lamp flashes on and off to show the fan motor abnormality. (See page 69.)

9-6. AUTO VANE OPERATION

(1) Vane motor drive

These models are equipped with a stepping motor for the horizontal vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.

(2) The horizontal vane angle and mode changes as follows by pressing the VANE CONTROL button.



(3) Positioning

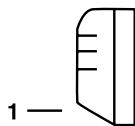
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

- (a) When the OPERATE/STOP(ON/OFF) button is pressed.
- (b) When the vane control is changed AUTO to MANUAL.
- (c) When the SWING is finished.
- (d) When the test run starts.
- (e) When the power supply turns ON.

(4) VANE AUTO (@) mode

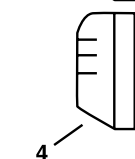
In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

(1) In COOL and DRY operation



Vane angle is fixed to Angle 1.

(2) In HEAT operation



Vane angle is fixed to Angle 4.

(5) Dew prevention

During COOL or DRY operation with the vane angle at Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

(6) SWING MODE (↔)

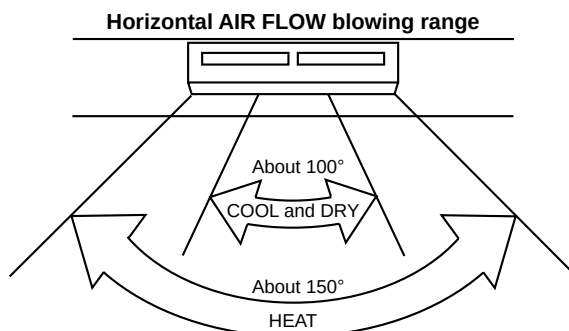
By pressing the SWING button, vertical vane swings horizontally. The remote controller displays "↔". SWING MODE is cancelled when any of the following operations are performed.

- The unit is turned off.
The vertical vane will return to the position just before the swing operation was started.
- The operation mode(AUTO, COOL, DRY or HEAT)is changed.
The vertical vane will return to the position just before the swing operation was started.
- The SWING button is pressed.
The vertical vane stops at the position when the button is pressed.

(7) Horizontal AIR FLOW (☞)

The vertical vane angle changes as follows by pressing the SWING button.

- Press the SWING button.
The vertical vane begins SWING.
- When the vertical vane moved to the desired position, press the SWING button again.
The vertical vane stop SWING.

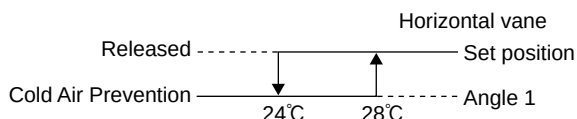


(8) Cold air prevention in HEAT operation.

When any of the following conditions occurs in HEAT operation, the vane angle changes to Angle 1 automatically to prevent cold air blowing on users.

- ① Compressor is not operating.
- ② Defrosting is performed.
- ③ Indoor coil thermistor RT12 reads 24°C or below.
- ④ Indoor coil thermistor RT12 temperature is raising from 24°C or below, but it does not exceed 28°C.

Indoor coil thermistor RT12 temperature



NOTE: If the temperature of RT12 reads from 24°C to 28°C at the air conditioner starting, this control works.

(9) ECONO COOL () operation (ECONOMical operation)

When the ECONO COOL button is pressed in COOL mode, set temperature is automatically set 2°C higher than that in COOL mode.

Also the horizontal vane swings in various cycle according to the temperature of indoor heat exchanger(RT12).

SWING operation makes you feel cooler than set temperature. So, even though the set temperature is higher than that in COOL mode, the air conditioner can keep comfort. As a result, energy can be saved.

NOTE : ECONO COOL operation not work in COOL mode of "I FEEL CONTROL".

SWING operation

In swing operation of ECONO COOL mode, the initial air flow direction is adjusted to "Horizontal".

According to the temperature of indoor coil thermistor RT12 at starting of this operation, next downward blow time is decided. Then when the downward blow has been finished, next horizontal blow time is decided.

For initial 10 min. the swing operation is performed in table G~H for quick cooling.

Also, after 10 min. when the difference of set temperature and room temperature is more than 2 degrees, the swing operation is performed in table D~H for more cooling.

The air conditioner repeats the swing operation in various cycle as follows.

	Temperature of indoor coil thermistor RT12	Downward blow time (sec.)	Horizontal blow time (sec.)
A	15°C or less	2	23
B	15°C to 17°C	5	20
C	17°C to 18°C	8	17
D	18°C to 20°C	11	14
E	20°C to 21°C	14	11
F	21°C to 22°C	17	8
G	22°C to 24°C	20	5
H	more than 24°C	23	2

9-7. TIMER OPERATION

1. How to set the timer

(1) Press OPERATE/STOP(ON/OFF) button to start the air conditioner.

(2) Check that the current time is set correctly.

NOTE : Timer operation will not work without setting the current time. Initially "AM0:00" blinks at the current time display of TIME MONITOR, so set the current time correctly with CLOCK SET button.

(3) Press ON or OFF TIMER buttons to select the operation.

"→|" button... AUTO START operation (ON timer)

"→○" button... AUTO STOP operation (OFF timer)

(4) Press HR. and MIN. button to set the timer. Time setting is 10-minute units.

HR. and MIN. button will work when "→|" or "→○" mark is flashing.

These marks disappear in 1 minute.

After setting the ON timer, check that OPERATION INDICATOR lamp of the indoor unit lights.

NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.

NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.

- A power failure occurs.
- The circuit breaker functions.

2. Cancel

TIMER setting can be cancelled with the ON or OFF TIMER buttons. ("→|" or "→○")

To cancel the ON timer, press the "→|" button.

To cancel the OFF timer, press the "→○" button.

TIMER is cancelled and the display of set time disappears.

PROGRAM TIMER

MSZ-G09SV -[E1] MSZ-G12SV -[E1]

MSZ-G09SV -[E2] MSZ-G12SV -[E2]

● The OFF timer and ON timer can be used in combination.

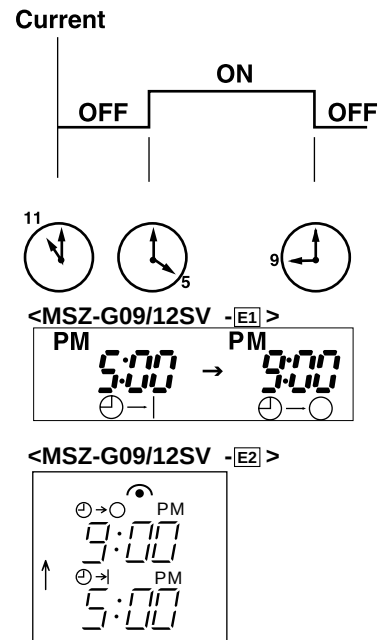
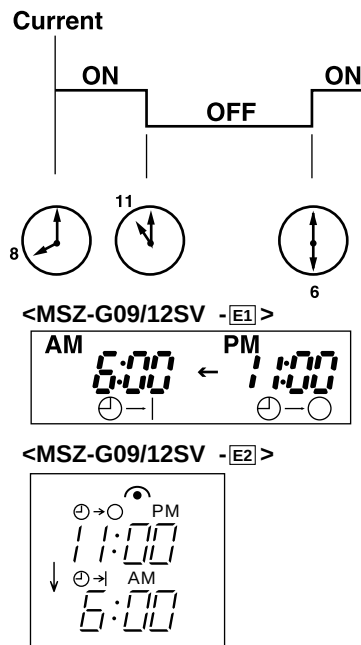
● “ → ” or “ ↑ ” and “ ← ” or “ ↓ ” display shows the order of the OFF timer and ON timer operation.

(Example 1) The current time is 8:00 PM.

The unit turns off at 11:00 PM, and on at 6:00 AM.

(Example 2) The current time is 11:00 AM.

The unit turns on at 5:00 PM, and off at 9:00 PM.



NOTE : TIMER setting will be cancelled by power failure or breaker functioning.

9-8. EMERGENCY-TEST OPERATION

In case of test run operation or emergency operation, use the EMERGENCY OPERATION switch on the front of the indoor unit. Emergency operation is available when the remote controller is missing, has failed or the batteries of remote controller run down. The unit will start and the OPERATION INDICATOR lamp will light.

The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan speed runs at High speed and the system is in continuous operation. (The thermostat is ON.)

After 30 minutes of test run operation the system shifts to EMERGENCY COOL / HEAT MODE with a set temperature of 24°C.

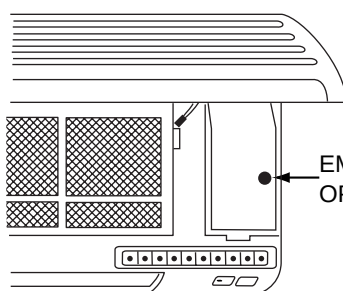
The fan speed shifts to Med. speed.

The coil frost prevention works even in emergency operation, and defrosting too.

In the test run or emergency operation, the horizontal vane operates in VANE AUTO (@) mode.

Emergency operation continues until the EMERGENCY OPERATION switch is pressed two or more times or the unit receives any signal from the remote controller. In case of latter normal operation will start.

NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.



EMERGENCY OPERATION switch

• The following indication applies regardless of the shape of lamp.

OPERATION INDICATOR lamp

Press once	<Cool>		☐
Press again	<Heat>	☐	
Press once again	<Stop>	☐	☐

9-9. Operational frequency control of outdoor unit

1. Outline

The operational frequency is as following:

First, the target operational frequency is set based on the difference between the room temperature and the set temperature.

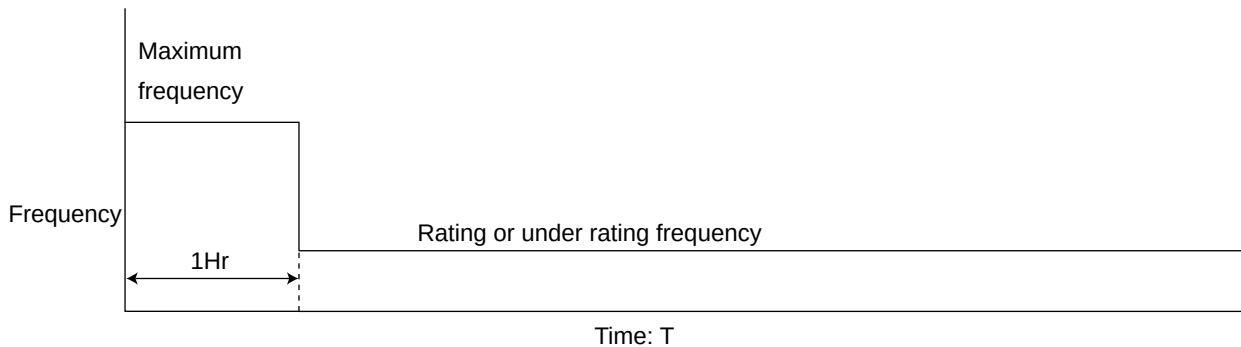
Second, the target operational frequency is regulated by discharge temperature protection, high pressure protection, electric current protection and overload protection and also by the maximum/minimum frequency.

(1) Maximum/minimum frequency in each operation mode.

Applied model	COOL			HEAT			DRY
	Minimum frequency	Rating frequency	Maximum frequency	Minimum frequency	Rating frequency	Maximum frequency	
MSZ-G09SV -E1 MSZ-G09SV -E2	45	79	92	45	95	105	45
MSZ-G12SV -E1 MSZ-G12SV -E2	15	85	105	15	96	125	30

※ The maximum frequency in COOL mode varies according to operation hours as shown below.

※ However, it is under rating frequency when indoor fan speed is set to MANUAL Low or AUTO Low.



(2) Frequency change speed

During increasing frequency

Operational frequency	MUZ-G09SV -E1 MUZ-G12SV -E1 MUZ-G09SV -E2 MUZ-G12SV -E2
10Hz~14Hz	0.5 sec./Hz
15Hz~79Hz	10 sec./Hz
80Hz~150Hz	0.5 sec./Hz

During decreasing frequency

Operational frequency	MUZ-G09SV -E1 MUZ-G12SV -E1 MUZ-G09SV -E2 MUZ-G12SV -E2
10Hz~42Hz	1 sec./Hz
43Hz~150Hz	0.5 sec./Hz

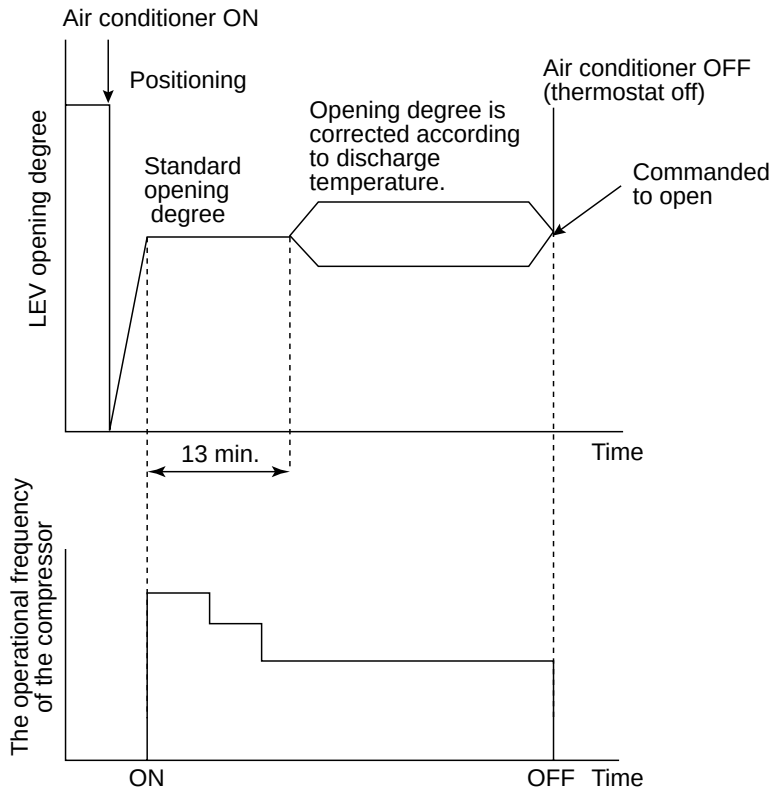
9-10. Expansion valve control (LEV control)

(1) Outline of LEV control

The LEV basic control is comprised of setting LEV opening degree to the standard opening degrees set for each operational frequency of the compressor. However, when any change in indoor/outdoor temperatures or other factors cause air conditioning load fluctuation, the LEV control also works to correct LEV opening degree based on discharge temperature (Shell temperature) of the compressor, developing the unit's performance.

standard specification	Control range	from min. 33 pulse to max. 350 pulse.
	Actuating speed	LEV opens 40 pulse/sec. and close 90 pulse/sec.
	Opening degree adjustment	LEV opening degree is always adjusted in opening direction. (When reducing the opening degree, LEV is once over-closed, and then adjusted to the proper degree by opening.)
general operation	Unit OFF	LEV remains at max. opening degree (reaches max. opening degree approx. 15 minutes after compressor stops)
	Remote controller ON	LEV is positioned. (first full-closed at zero pulse and then positioned.)
	During 2 to 13 minutes after compressor starts	Opening degree is adjusted according to standard opening degree. (Standard opening degree is set for each rotational frequency of compressor)
	More than 13 minutes have passed since compressor start-up	LEV opening degree is corrected to get target discharge temperature of compressor. (For discharge temperature lower than target temperature, LEV is corrected in closing direction.) (For discharge temperature higher than target temperature, LEV is corrected in opening direction.) *It may take more than 30 minutes to reach target temperature, depending on operating conditions.
	Thermostat OFF	LEV starts to open every 3 pulse/sec. from the same opening degree as that when the Unit turned OFF (and becomes full-opened after approx. 15 minutes.)
	Thermostat ON	LEV is controlled in the same way as that is after the compressor has started up.
	Defrosting in HEAT mode	LEV is adjusted to open 350 pulse.

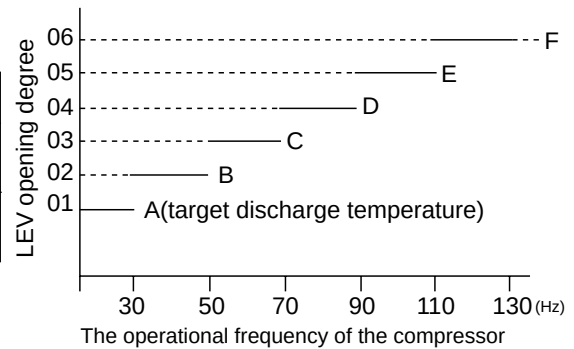
(2) Time chart



(3) Control data

(a) Reference value of target discharge temperature (COOL/HEAT °C)

	A	B	C	D	E	F
MSZ-G09SV -[E1]	58/49	63/58	69/66	74/71	74/76	74/78
MSZ-G09SV -[E2]						
MSZ-G12SV -[E1]	57/48	60/57	67/66	75/71	78/76	78/78
MSZ-G12SV -[E2]						



In COOL mode, the two indoor coil thermistor (one main and one sub) sense temperature ununiformity (super heat) at the heat exchanger, and when temperature difference have developed, the indoor coil thermistors adjust LEV opening to get approximate 10 degrees lower temperature than the target temperature in the table above, thus diminishing super heat.

(b) Reference value of LEV standard degree opening (COOL/ HEAT pulse)

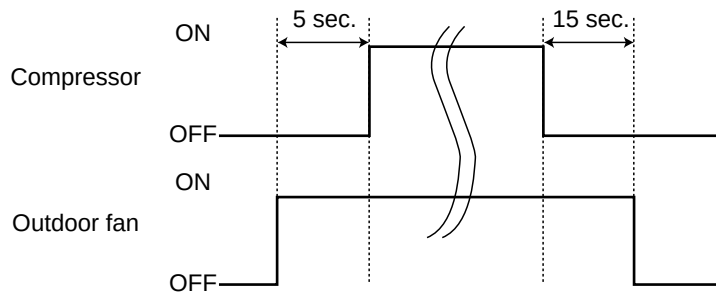
	01	02	03	04	05	06
MSZ-G09SV -[E1]	150/70	170/90	180/110	190/140	200/150	200/160
MSZ-G09SV -[E2]						
MSZ-G12SV -[E1]	160/90	190/120	200/140	220/160	240/180	255/200
MSZ-G12SV -[E2]						

9-11. Outdoor fan motor control

The AC fan motor turns ON/OFF, interlocking with the compressor.

[ON] The AC fan motor turns ON 5 seconds before the compressor starts up.

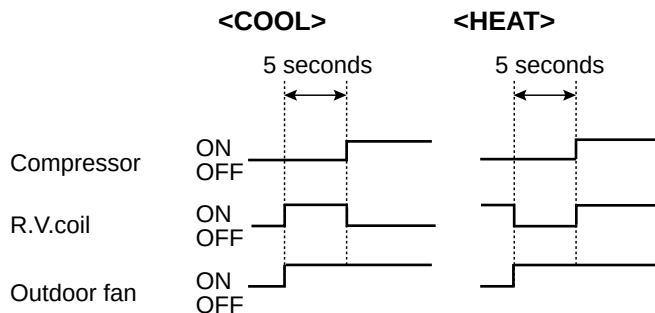
[OFF] The AC fan motor turns OFF 15 seconds after the compressor has stopped running.



9-12. R.V. coil control

Heating ON
Cooling OFF
Dry OFF

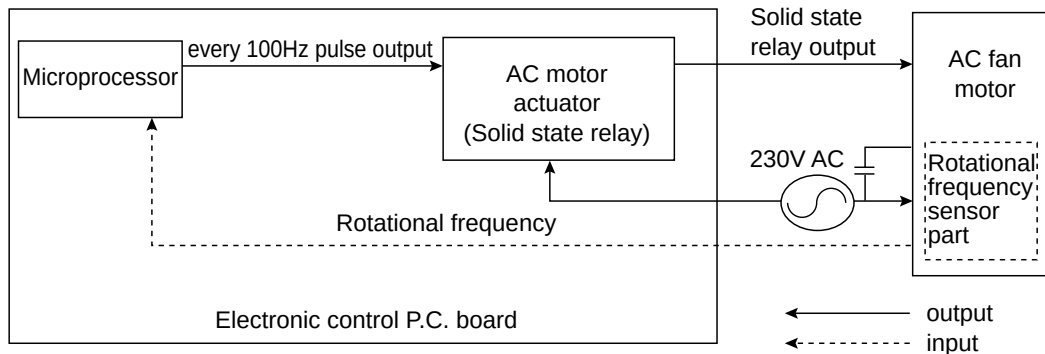
NOTE: The 4-way valve reverses for 5 seconds right before start-up of the compressor.



9-13. Indoor fan motor control

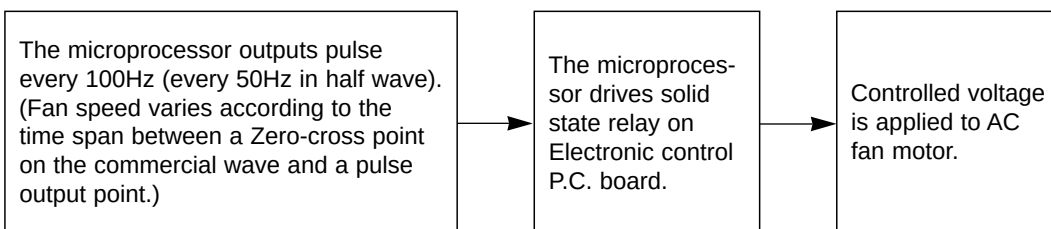
The detected rotational frequency of the indoor fan motor (AC fan motor) is feed-back to the microprocessor and then the microprocessor works to keep the rotational frequency at a fixed value against load fluctuation.

(1) Circuit block diagram

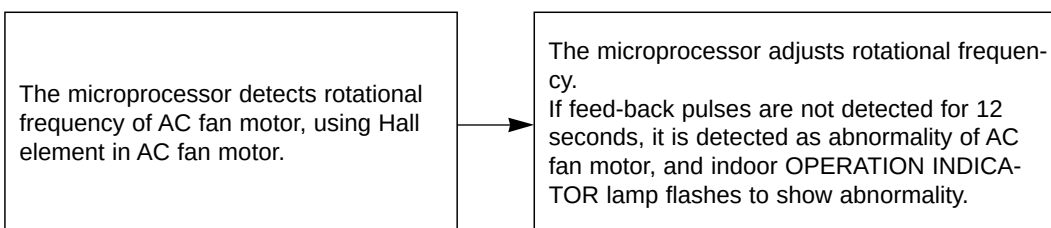


(2) Control system

<Output side>



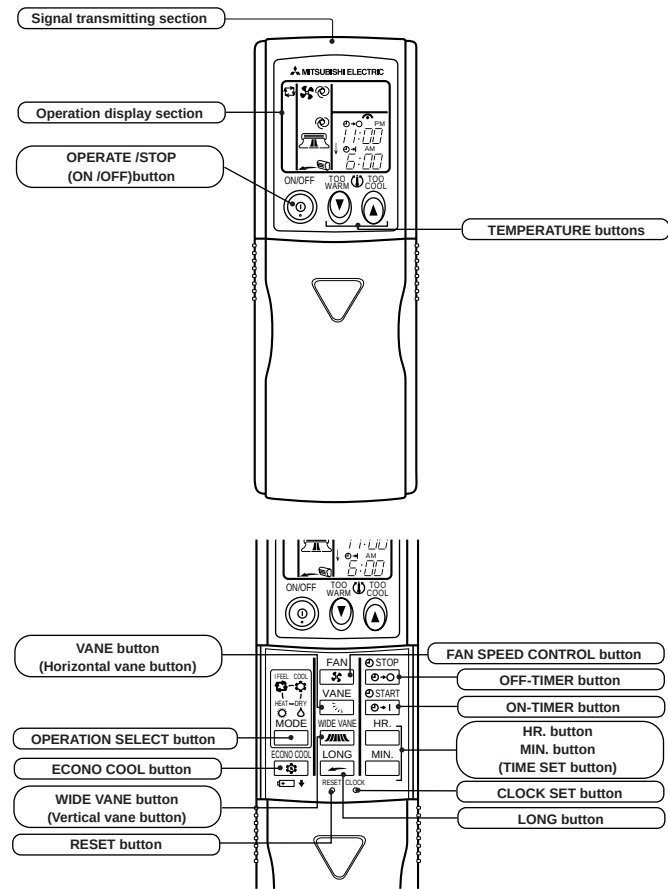
<Input side>



MSZ-G20SV -E1 MUZ-G20SV -E1

9-14. on page 48 ~ 9-29. on page 63

WIRELESS REMOTE CONTROLLER

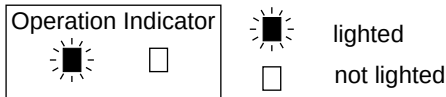


INDOOR UNIT DISPLAY SECTION

Operation Indicator lamp

The operation indicator at the right side of the indoor unit indicates the operation state.

•The following indication applies regardless of shape of the indicator.



Indication	Operation state	Difference between target temperature and room temperature
	This shows that the air conditioner is operating to reach the target temperature. Please wait until the target temperature is obtained.	Approx. 2 °C or more
	This shows that the room temperature is approaching the target temperature.	Approx. 2 °C or less

Once the operation mode are set, the same operation mode can be repeated by simply turning the OPERATE/STOP(ON/OFF) button ON.

Indoor unit receives the signal with a beep tone.

When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

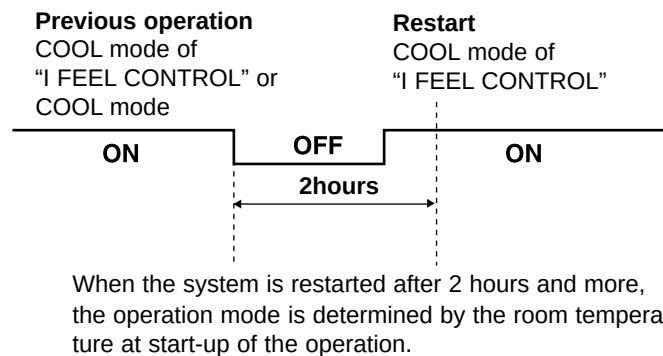
9-14. "I FEEL CONTROL" (I) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button on the remote controller. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- (2) Select "I FEEL CONTROL" (I) mode with the OPERATION SELECT button.
- (3) The operation mode is determined by the room temperature at start-up of the operation.

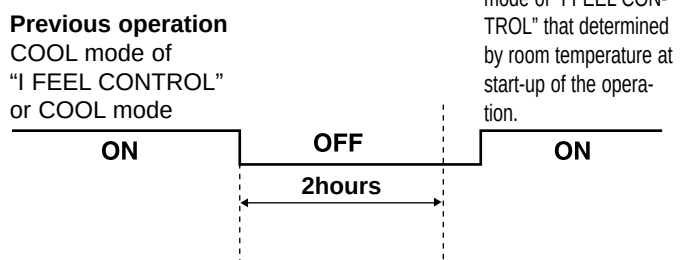
Initial room temperature	Mode
25°C or more	COOL mode of "I FEEL CONTROL"
23°C to 25°C	DRY mode of "I FEEL CONTROL"
less than 23°C	HEAT mode of "I FEEL CONTROL"

- Once the mode is fixed, the mode does not change by room temperature afterwards.
- Under the ON-TIMER (⊖|) operation, mode is determined according to the room temperature at the set time the operation starts.
- When the system is stopped on the remote controller and restarted within 2 hours in "I FEEL CONTROL" (I) mode, the system operates in previous mode automatically regardless of the room temperature.

Operation time chart
Example



Operation time chart
Example



(4) The initial set temperature is decided by the initial room temperature.

Model	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	26℃ or more	24℃	※1
	25℃ to 26℃	Initial room temperature minus 2℃	
DRY mode of "I FEEL CONTROL"	23℃ to 25℃	Initial room temperature minus 2℃	
HEAT mode of "I FEEL CONTROL"	less than 23℃	26℃	

*1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of the room temperature at restart.
The set temperature is calculated by the previous set temperature.

(5) TEMPERATURE buttons

In "I FEEL CONTROL" (I) mode, set temperature is decided by the microprocessor based on the room temperature. In addition, set temperature can be controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm.

Each time the TOO WARM or TOO COOL button is pressed the indoor unit receives the signal and emit a beep tone.

● Fuzzy control

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.

In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.



... To raise the set temperature 1~2 degrees (°C)



... To lower the set temperature 1~2 degrees (°C)

9-14-1. COOL mode of "I FEEL CONTROL"

1. Indoor fan speed control

Indoor fan operates continuously at the set speed by FAN SPEED CONTROL button regardless of the thermostat's OFF-ON.

In AUTO the fan speed is as follows.

Initial temperature difference	Fan Speed	Difference between room temperature and set temperature during operation
Room temperature minus set temperature : 1.7 degrees or more	High	
Room temperature minus set temperature : Between 1 and 1.7 degrees	Med.	
Room temperature minus set temperature : less than 1 degree	Low	

2. Coil frost prevention

① Temperature control

When the indoor coil thermistor RT12 or RT13 reads -1°C or below, the coil frost prevention mode starts immediately. However the coil frost prevention doesn't work for 5 minutes since the compressor has started.

The indoor fan operates at the set speed and the compressor stops for 5 minutes.

After that, if RT12 or RT13 still reads below -1°C this mode prolonged until the RT12 and RT13 reads over -1°C.

② Time control

When the three conditions as follows have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.

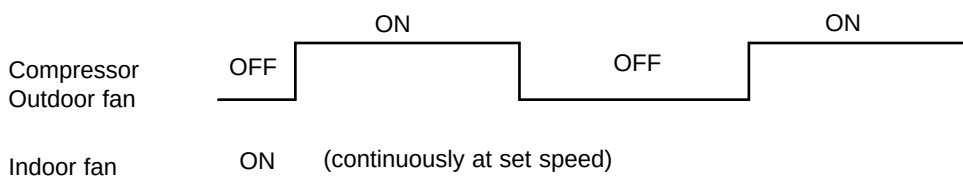
- Compressor has been continuously operating.
- Indoor fan speed is Low or Med..
- Room temperature is below 26°C.

When compressor stops, the accumulated time is cancelled and when compressor restarts, time counting starts from the beginning.

Time counting also stops temporarily when the indoor fan speed becomes High or the room temperature exceeds 26°C. However, when two of the above conditions (b. and c.) are satisfied again. Time accumulation is resumed.

Operation chart

Example



9-14-2. DRY mode of "I FEEL CONTROL"

The system for dry operation uses the same refrigerant circuit as the cooling circuit.

The compressor and the indoor fan are controlled by the room temperature.

By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

In AUTO fan speed becomes Low.

2. The operation of the compressor and indoor / outdoor fan

Compressor operates by room temperature control and time control.

- Set temperature is controlled to fall 2°C from initial room temperature.
- Indoor fan and outdoor fan operate in the same cycle as the compressor.
- Operational frequency of compressor during operation is fixed to 84Hz.

NOTE : Coil frost prevention during DRY mode of "I FEEL CONTROL"

The operation is same as coil frost prevention during COOL mode of "I FEEL CONTROL".

3. Coil frost prevention

The operation is as same as coil frost prevention during COOL mode of "I FEEL CONTROL".

Indoor fan operates at the set speed and the compressor stops for 5 minutes, because protection (Coil frost prevention) has the priority.

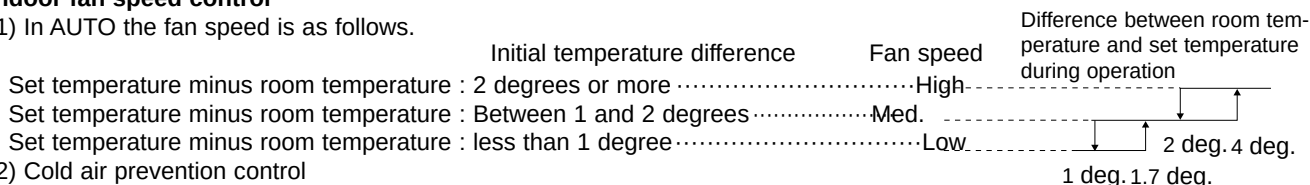
4. Outdoor fan control

Outdoor fan control is as same as during COOL mode of "I FEEL CONTROL".

9-14-3. HEAT mode of "I FEEL CONTROL"

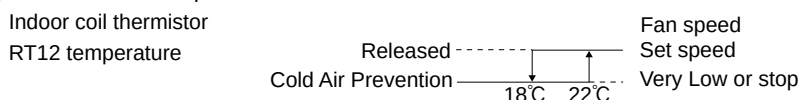
1. Indoor fan speed control

(1) In AUTO the fan speed is as follows.



(2) Cold air prevention control

The fan runs at set speed when the indoor coil thermistor RT12 temperature exceeds 22°C. The fan operates at Very Low when the temperature of indoor coil thermistor RT12 is below 18°C. But the fan stops when the indoor fan operates at Very Low and the temperature is 15°C or less.



NOTE : If the temperature of RT12 reads from 18°C to 22°C at the air conditioner starting and also after defrosting, this control works.

(3) Warm air control

When compressor starts in heating operation or after defrosting, the fan changes the speed due to the indoor coil thermistor RT12 temperature to blow out warm air.

After releasing of cold air prevention, when the indoor coil thermistor RT12 temperature is 37°C or above, the fan speed shifts to the set speed, and when the fan speed is changed by the remote controller, the fan speed is the set speed.

When the indoor coil thermistor RT12 temperature is less than 37°C, the fan speed is controlled by time as below.

<Time condition> <Indoor fan speed>

less than 2 minutes Low

2 minutes to 4 minutes.....Med.

4 minutes or more High

The upper limit of the fan speed is the set speed.

If the thermostat turns off, this operation changes to flow soft control.

(4) Flow soft control

After the thermostat turns off, the indoor fan operates at Very Low.

NOTE : When the thermostat turns on, the fan operates at the set speed. Due to the cold air prevention control, the fan does not start at set speed until the indoor coil thermistor RT12 reads 22°C or more.

2. Outdoor fan control

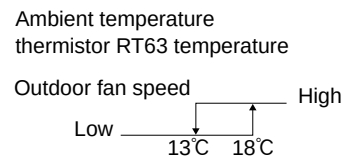
Outdoor fan speed is controlled according to the temperature of ambient temperature thermistor RT63.

Outdoor fan Low operation : Until when the outside temperature decreases to 13°C or less.

When the outside temperature goes to 18°C or more.

Outdoor fan High operation : When the outside temperature decreases to 13°C or less.

Until when the outside temperature goes to 18°C or more.



3. High pressure protection

During heating operation, the outdoor fan and the compressor are controlled by the temperature of indoor coil thermistor RT12 for excess rise protection of compressor discharge pressure.

• Outdoor fan

When the temperature of indoor coil thermistor RT12 goes to 55°C or more, the outdoor fan is turned OFF.

When the temperature of indoor coil thermistor RT12 becomes to 52°C or less, the outdoor fan is turned ON.

• Compressor

When the temperature of indoor coil thermistor RT12 goes to 75°C or more, the compressor is turned OFF.

3 minutes after the compressor is turned OFF and if the temperature of indoor coil thermistor RT12 becomes 75°C or less, the compressor is turned ON.

NOTE : During the high pressure protection and for 10 seconds after high pressure protection, defrosting of outdoor heat exchanger is not detected by the defrost thermistor RT61.

4. Discharge temperature protection

Discharge temperature protection is as same as during COOL mode of "I FEEL CONTROL".

5. Defrosting

Defrosting of outdoor heat exchanger is controlled by deicer P.C. board, with detection by the defrost thermistor RT61.

(1) Starting conditions of defrost

When all conditions of a) ~ c) are satisfied, the defrosting operation starts.

a) Under the heat operation, the compressor cumulative operation time exceeds 40 minutes without the defrosting operation working.

b) The defrost thermistor RT61 reads - 3°C or less.

c) After releasing the high pressure protection, 10 seconds have elapsed.

(2) Releasing conditions of defrost

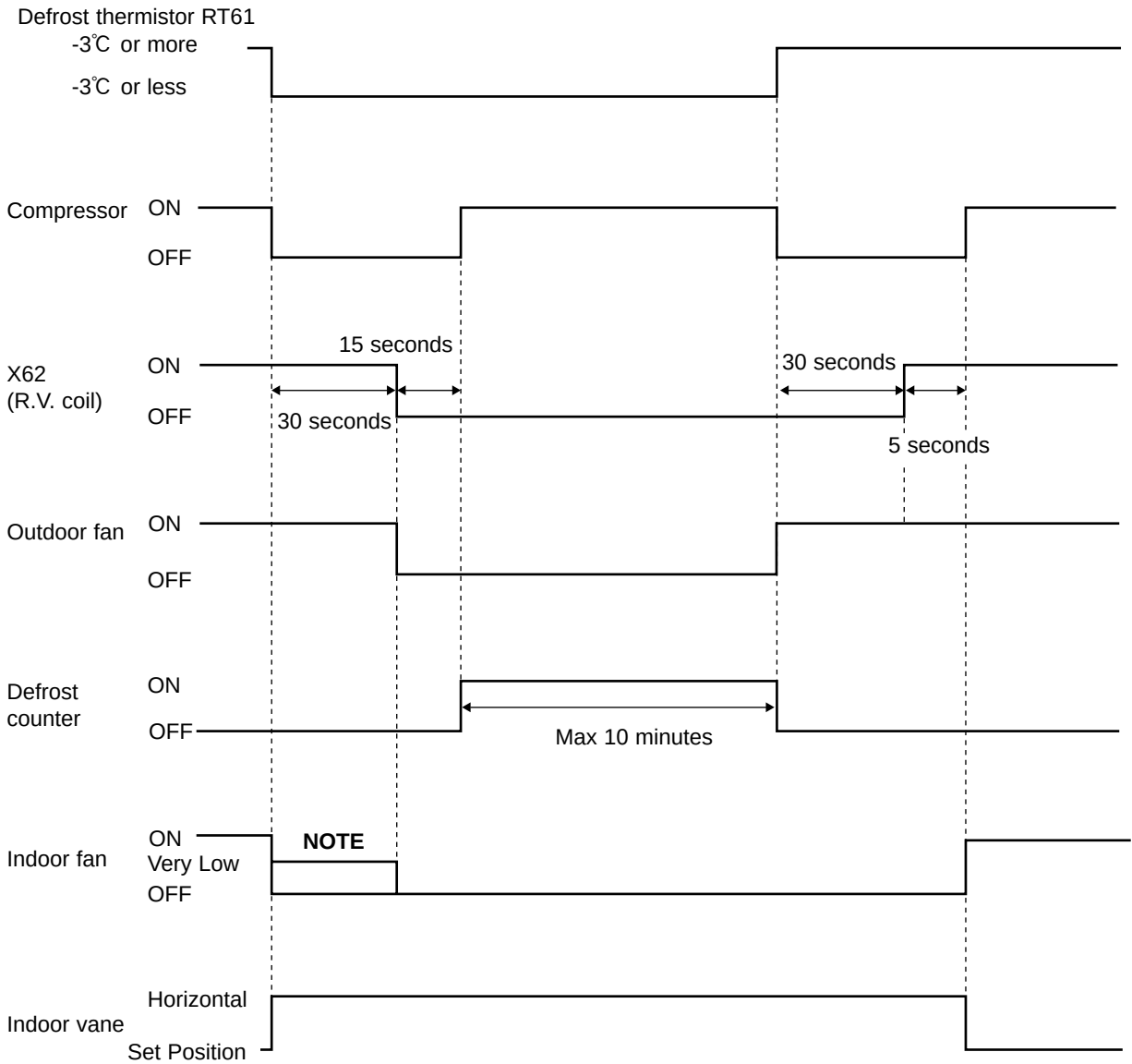
When the condition d) or e) is satisfied, the defrosting operation stops.

d) The defrost thermistor RT61 reads 13°C or more.

e) The defrosting time exceeds 10 minutes.



(3) Defrosting time chart

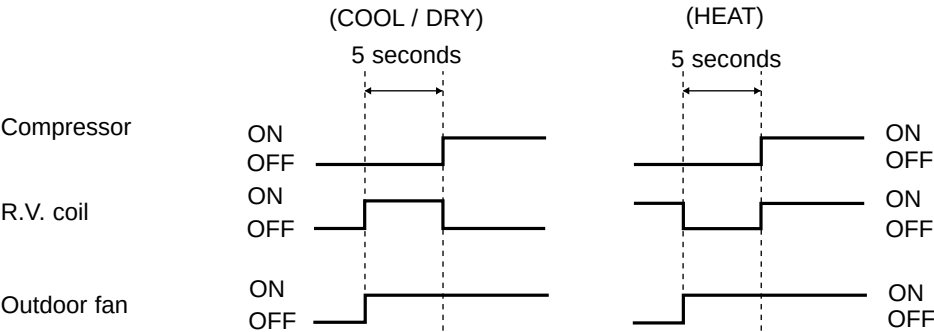


NOTE ● When the indoor coil thermistor reads above 18°C, indoor fan operates at Very Low for 30 seconds.
● When the indoor coil thermistor reads 18°C or less, the indoor fan stops.

6. R.V. coil control

Heating ON
Cooling OFF
Dry OFF

NOTE: The 4-way valve reverses for 5 seconds right before start-up of the compressor.

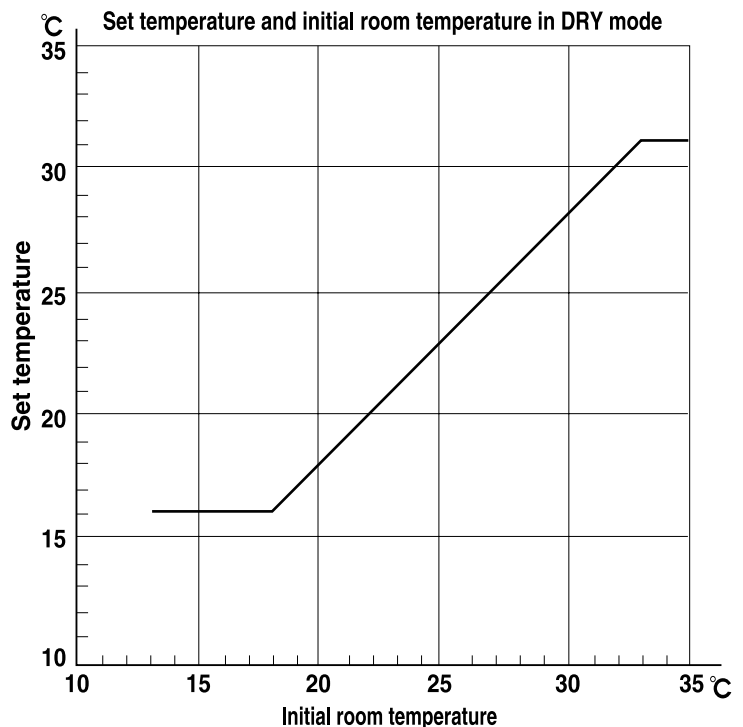


9-15. COOL (❄) OPERATION

- (1) Press OPERATE/STOP (ON/OFF) button.
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- (2) Select COOL mode with the OPERATION SELECT button.
- (3) Press the TEMPERATURE buttons.
(TOO WARM or TOO COOL button) to select the decided temperature.
The setting range is 16 ~ 31°C
* Indoor fan continues to operate regardless of thermostat's OFF-ON at set speed.
* Coil frost prevention is as same as COOL mode of "I FEEL CONTROL".

9-16. DRY (☹) OPERATION

- (1) Press OPERATE/STOP (ON/OFF) button.
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- (2) Select DRY mode with the OPERATION SELECT button.
- (3) The microprocessor reads the room temperature and determines the set temperature.
Set temperature is as shown on the right chart.
Thermostat (SET TEMP.) does not work.
The other operations are same as DRY mode of "I FEEL CONTROL".
- (4) DRY operation will not function when the room temperature is 13°C or below.

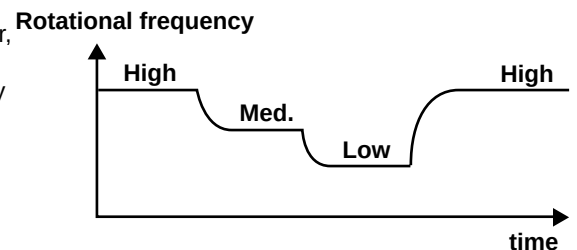


9-17. HEAT (☼) OPERATION

- (1) Press OPERATE/STOP (ON/OFF) button.
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- (2) Select HEAT mode with the OPERATION SELECT button.
- (3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C.
- (4) Indoor fan speed control, outdoor fan control, high pressure protection, discharge temperature protection control, defrosting, R.V. coil control are the same as HEAT mode of "I FEEL CONTROL".

9-18. FAN MOTOR CONTROL

- (1) Rotational frequency feedback control
The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feedback the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (High, Med., Low), the microprocessor controls SR141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.

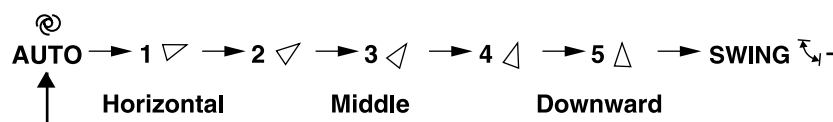


- (2) Fan motor lock-up protection
When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the OPERATION INDICATOR lamp flashes on and off to show the fan motor abnormality. (Refer to page 70.)

9-19. AUTO VANE OPERATION

1. Horizontal vane

- (1) Vane motor drive
These models are equipped with a stepping motor for the horizontal vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.
- (2) The horizontal vane angle and mode changes as follows by pressing the VANE button.



(3) Positioning

The horizontal vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle.

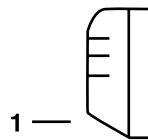
Confirming of standard position is performed in case of follows.

- (a) When the OPERATE/STOP(ON/OFF) button is pressed (POWER ON/OFF).
- (b) When the vane control is changed from AUTO to MANUAL.
- (c) When the SWING is finished.
- (d) When the test run starts.
- (e) When the power supply turns ON.

(4) VANE AUTO () mode

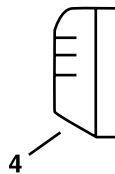
In VANE AUTO mode, the microprocessor automatically determines the horizontal vane angle and operation to make the optimum room-temperature distribution.

① In COOL and DRY operation



Vane angle is fixed to Angle 1.

② In HEAT operation



Vane angle is fixed to Angle 4.

(5) STOP (operation OFF) and ON-TIMER standby.

When the following cases occur, the horizontal vane returns to the closed position.

- (a) When the OPERATE/STOP(ON/OFF) button is pressed (POWER OFF).
- (b) When the operation is stopped by the emergency operation.
- (c) When the ON-TIMER is on standby.

(6) Dew prevention

During COOL or DRY operation at vane Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

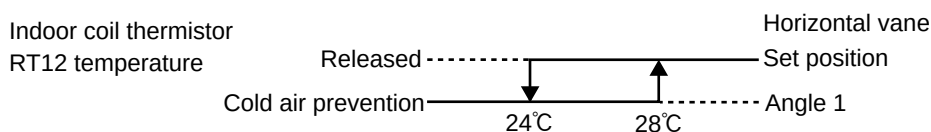
(7) SWING MODE ()

By selecting SWING mode with the VANE button, the horizontal vane swings vertically. The remote controller displays “  ”.

(8) Cold air prevention in HEAT operation

When any of the following conditions occurs in HEAT operation, the horizontal vane angle changes to Angle 1 automatically to prevent cold air blowing on users.

- ① Compressor is not operating.
- ② Defrosting is performed.
- ③ Indoor coil thermistor RT12 reads 24°C or below.
- ④ Indoor coil thermistor RT12 temperature is raising from 24°C or below, but it does not exceed 28°C.



NOTE : If the temperature of RT12 reads from 24°C to 28°C at the air conditioner starting, this control works.

(9) ECONO COOL () operation (ECONOmical operation)

When the ECONO COOL button is pressed in COOL mode, set temperature is automatically set 2°C higher than that in COOL mode.

Also the horizontal vane swings in various cycle according to the temperature of indoor heat exchanger(Tp(* 1)).

SWING operation makes you feel cooler than set temperature. So, even though the set temperature is higher than that in COOL mode, the air conditioner can keep comfort. As a result, energy can be saved.

ECONO COOL operation is cancelled when the ECONO COOL button is pressed once again or VANE button is pressed or LONG button is pressed or change to other operation mode.

NOTE : ECONO COOL operation not work in COOL mode of "I FEEL CONTROL".

SWING operation

* 1 Tp : Minimum value of indoor coil thermistor (main) RT12 and indoor coil thermistor (sub) RT13

In swing operation of ECONO COOL mode, the initial air flow direction is adjusted to "Horizontal".

According to the temperature of indoor coil thermistor Tp(* 1) at starting of this operation, next downward blow time is decided. Then when the downward blow has been finished, next horizontal blow time is decided.

For initial 10 minutes the swing operation is performed in table G~H for quick cooling.

Also, after 10 minutes when the difference of set temperature and room temperature is more than 2°C, the swing operation is performed in table D~H for more cooling.

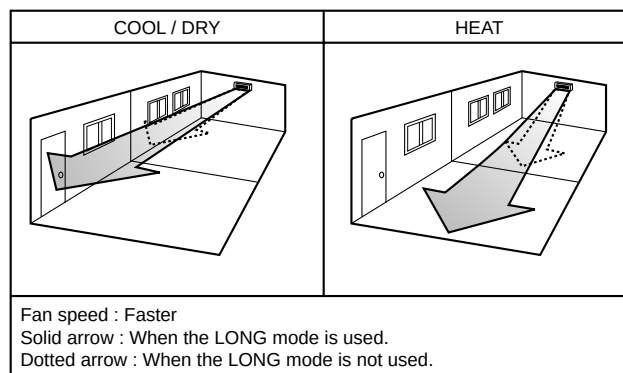
The air conditioner repeats the swing operation in various cycle as follows.

	Temperature of Tp(* 1)	Downward blow time (sec.)	Horizontal blow time (sec.)
A	15°C or less	2	23
B	15°C to 17°C	5	20
C	17°C to 18°C	8	17
D	18°C to 20°C	11	14
E	20°C to 21°C	14	11
F	21°C to 22°C	17	8
G	22°C to 24°C	20	5
H	more than 24°C	23	2

(10) LONG MODE ()

By pressing the LONG button fan speed becomes faster than setting fan speed on the remote controller, and the horizontal vane moves to the position for LONG mode. The remote controller displays "  ". LONG mode is cancelled when the LONG button is pressed once again or the VANE button is pressed or ECONO COOL button is pressed in COOL mode .

- In the following example, the vertical vane is set to  (front.).

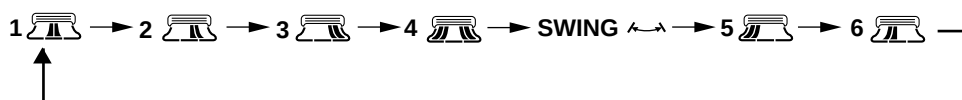


2. Vertical vane

(1) Vane motor drive

This model is equipped with a stepping motor for the vertical vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.

(2) The vertical vane angle and mode changes as follows by pressing the WIDE VANE button.



(3) Positioning

The vane is once pressed to the vane stopper to confirm the standard position and then set to the desired angle.

Confirming of standard position is performed in case of follows.

(a) When the OPERATE/STOP(ON/OFF) button is pressed (POWER ON/OFF).

(b) When the SWING is started or finished.

(c) When the power supply turns ON.

(4) SWING MODE (↔)

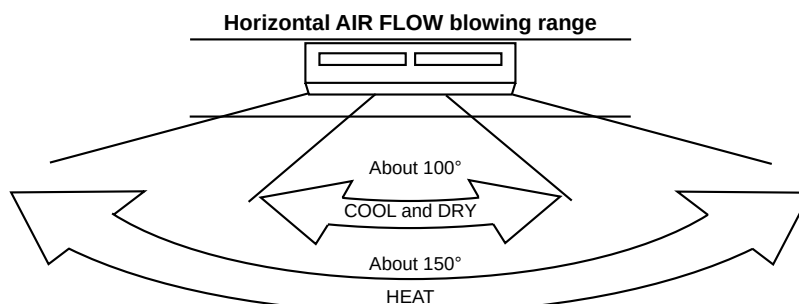
By selecting SWING mode with the WIDE VANE button, the vertical vane swings horizontally. The remote controller displays "↔". The vane moves right and left in the width of Angle 4 repeatedly.

(5) WIDE MODE (🌀)

By selecting WIDE mode with the WIDE VANE button, indoor fan speed becomes faster than setting fan speed on the remote controller(*). The remote controller displays "🌀".

NOTE : The position of vane angle 3, angle 4 and angle 5 are different in COOL operation and HEAT operation.

* Indoor fan speed becomes faster than setting fan speed on the remote controller even when 🌀 or 🌀 is selected.



9-20. TIMER OPERATION

1. How to set the timer

(1) Press OPERATE/STOP(ON/OFF) button to start the air conditioner.

(2) Check that the current time is set correctly.

NOTE : Timer operation will not work without setting the current time. Initially "AM0:00" blinks at the current time display of TIME MONITOR, so set the current time correctly with CLOCK SET button.

(3) Press ON/OFF TIMER button to select the operation.

ON-TIMER button... AUTO START operation (ON timer)

OFF-TIMER button... AUTO STOP operation (OFF timer)

(4) Press HR. and MIN. button (TIME set button) to set the timer. Time setting is 10-minute units.

HR. and MIN. button will work when "⌚→|" or "⌚→○" mark is flashing.

These marks disappear in 1 minute.

After setting the ON timer, check that OPERATION INDICATOR lamp of the indoor unit lights.

NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.

NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.

- A power failure occurs.
- The circuit breaker functions.

2. Cancel

TIMER setting can be cancelled with the ON/OFF TIMER buttons.

To cancel the ON timer, press the ON-TIMER button.

To cancel the OFF timer, press the OFF-TIMER button.

TIMER is cancelled and the display of set time disappears.

PROGRAM TIMER

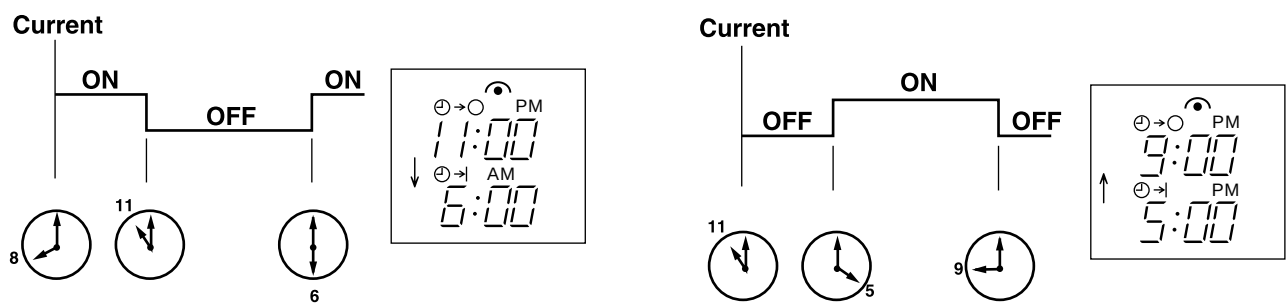
- The OFF timer and ON timer can be used in combination.
- “↑” and “↓” display shows the order of the OFF timer and ON timer operation.

(Example 1) The current time is 8:00 PM.

The unit turns off at 11:00 PM, and on at 6:00 AM.

(Example 2) The current time is 11:00 AM.

The unit turns on at 5:00 PM, and off at 9:00 PM.



NOTE : TIMER setting will be cancelled by power failure or breaker functioning.

9-21. EMERGENCY-TEST OPERATION

In case of test run operation or emergency operation, use the EMERGENCY OPERATION switch on the front of the indoor unit. Emergency operation is available when the remote controller is missing, has failed or the batteries of remote controller run down. The unit will start and the OPERATION INDICATOR lamp will light.

The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan speed runs at High speed and the system is in continuous operation. (The thermostat is ON.)

After 30 minutes of test run operation the system shifts to EMERGENCY COOL / HEAT MODE with a set temperature of 24°C.

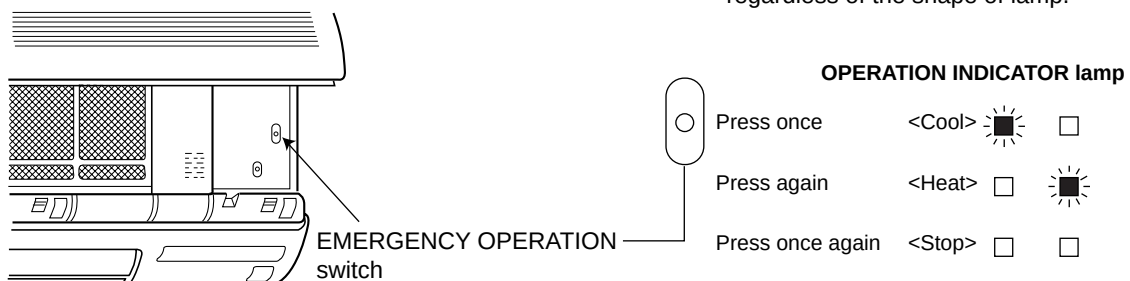
The fan speed shifts to Med. speed.

The coil frost prevention works even in emergency operation, and defrosting too.

In the test run or emergency operation, the horizontal vane operates in VANE AUTO (@) mode.

Emergency operation continues until the EMERGENCY OPERATION switch is pressed once or twice or the unit receives any signal from the remote controller. In case of latter normal operation will start.

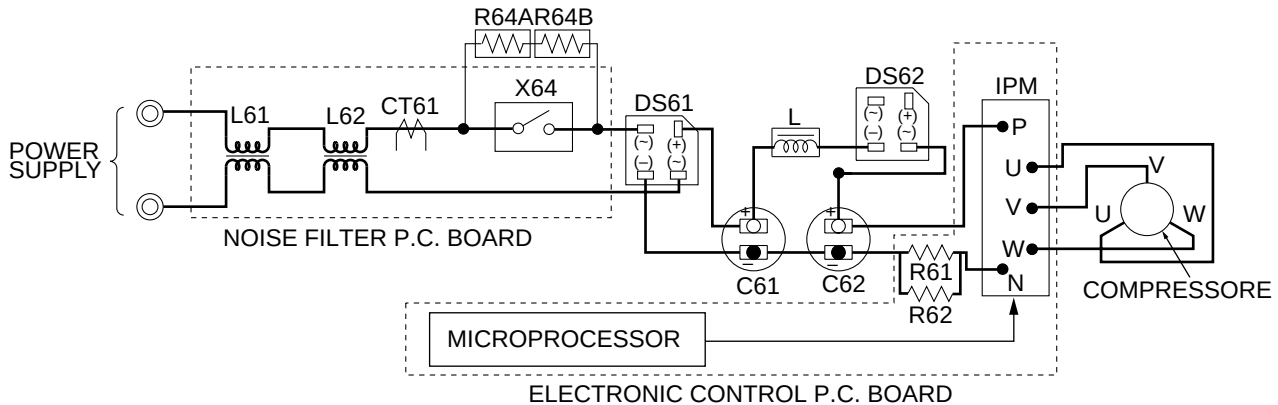
NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.



- The following indication applies regardless of the shape of lamp.

9-22. Main power supply circuit

Outline drawing of main power supply



1. Outline of main power supply circuit

(1) When the electricity is turned on to the outdoor unit

Rush current generates in the main power supply circuit.

To prevent the rush current from running into the main power supply circuit, R64A and R64B (Current-limiting resistor) absorb the rush current.

After the rush current is absorbed, X64 (Relay) is ON and the circuit to R64A and R64B are short-circuited, then the electricity to R64A and R64B are bypassed.

Following the indoor unit's operation, X64 is switched to ON or OFF.

(2) At normal operation

Alternating current supplied from power supply is eliminated of any noise by L61 (Common mode choke coil) and L62 (Common mode choke coil). Then DS61 (Diode stack) performs full-wave rectification of alternating current and the alternating current is converted to direct current.

C62 (Smoothing capacitor) stabilizes the power supply converted to direct current from alternating current and supplies it to IPM (Intelligent power module).

Direct current rectified by DS61 is converted to three-phase alternating current by IPM. Microcomputer installed in the electronic control P.C. board controls frequency and voltage of three-phase alternating current converted by IPM.

Three-phase alternating current from IPM is supplied to the compressor with frequency and voltage decided by microcomputer based on various kinds of information. R61 and R62 (Current-detecting resistor) are installed for overload protection of the compressor and for protection of IPM.

CT61 (Current transformer) measures the current of main power supply circuit.

2. Power factor improvement of power supply

Unlike inverter-less alternating current circuit, the power factor of this inverter circuit is improved by extending the period of the current running in the circuit. C62 is used in this circuit to supply stable direct current voltage. However, in case only C62 is used for stable supply of direct current, the power factor of power supply is lowered because the period of direct current running in the circuit is short. Therefore, for improvement of power factor, the circuit also uses C61 (Power factor capacitor), L (Reactor) and DS62 (Diode stack) to prepare the direct current circuit to extend the period of the current running in the circuit.

3. Elimination of electrical noise

Noise filter circuit is formed by L61, L62, and the condenser installed on the noise filter P.C. board. It eliminates the electrical noise (both common mode and normal mode noise) of alternating current power supply supplied to main power supply circuit. Noise filter circuit also absorbs electrical noise that is generated in the inverter circuit and prevents it from reaching outside of the unit.

4. IPM

Six power transistors that outputs the direct current waveform as three-phase alternating current waveform, the driving circuit which operates the power transistors, and the overcurrent detecting circuit which protects the power transistors are built into the IPM. It can simplify and miniaturize the control circuit.

Symbol	Name	Function
C61	POWER-FACTOR CAPACITOR	It improves the power factor of power supply.
C62	SMOOTHING CAPACITOR	It stabilizes the direct current voltage.
CT61	CURRENT TRANSFORMER	It measures the current of main power supply circuit.
DS61	DIODE STACK	It converts the alternating current voltage to direct current voltage.
DS62	DIODE STACK	It is combined with L to improve the power factor of power supply.
IPM	INTELLIGENT POWER MODULE	It generates three-phase alternating current and operates compressor.
L	REACTOR	It is combined with DS62 to improve the power factor of power supply.
L61	COMMON MODE CHOKE COIL	It eliminates and absorbs the electrical noise.
L62	COMMON MODE CHOKE COIL	It eliminates and absorbs the electrical noise.
R61, R62	CURRENT-DETECTING RESISTOR	It detects the current and protects the compressor and IPM.
R64A R64B	CURRENT-LIMITING RESISTOR	It absorbs the rush current so not to run into the main power supply circuit when the electricity is turned on.
X64	RELAY	It short-circuits the circuit to current-limiting resistor when the compressor operates.

9-23. Operational frequency control of outdoor unit

1. Outline

The operational frequency is as following:

First, the target operational frequency is set based on the difference between the room temperature and the set temperature.

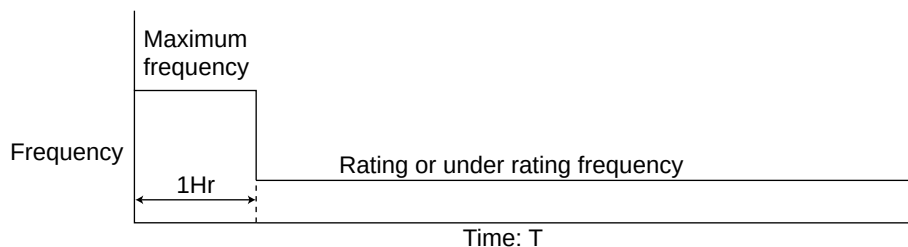
Second, the target operational frequency is regulated by discharge temperature protection, high pressure protection, electric current protection and overload protection and also by the maximum/minimum frequency.

Maximum/minimum frequency in each operation mode.

COOL		HEAT		DRY
Minimum frequency	Maximum frequency	Minimum frequency	Maximum frequency	
15	120	15	120	84

※ The maximum frequency in COOL mode varies according to operation hours as shown below.

※ However, it is under rating frequency when indoor fan speed is set to MANUAL Low or AUTO Low.



2. Control by the difference between the room temperature and the set temperature

The frequency is controlled by the difference between the room temperature and the set temperature.

(1) Frequency when the unit starts operation

At the cooling operation

The difference between the room temperature and the set temperature (deg.)	Operation frequency (Hz)
1.8 or less	15
1.8 to 2.3	15
2.3 to 3.6	20
3.6 to 4.9	25
4.9 to 5.9	30
5.9 to 6.7	35
6.7 or more	120

At the heating operation

The difference between the room temperature and the set temperature (deg.)	Operation frequency (Hz)
2.3 or less	15
2.3 to 3.1	15
3.1 to 4.1	20
4.1 to 5.4	25
5.4 to 5.9	30
5.9 to 6.7	35
6.7 or more	120

(2) Frequency after the unit starts operation (Except for the case where the unit operates with the maximum operation frequency)

In case the difference between the room temperature and the set temperature shown on (1) is changed during operation or it is not changed for 128 seconds, the compressor operates with new operation frequency that is calculated from actual operation frequency and the rate of change by fuzzy control.

3. Frequency control by estimated discharge temperature (for protecting the discharge temperature in case the estimated discharge temperature is 100°C or higher)

By calculating the difference between the current discharge temperature and the discharge temperature 15 seconds before, a discharge temperature in one minutes is estimated. As a result, the frequency and LEV are controlled as shown the table below.

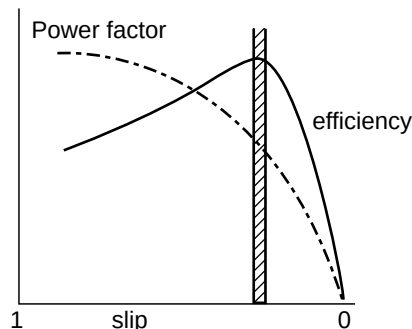
Estimated discharge temperature(°C)	Frequency control	LEV control
116 or higher	Lowered by 12Hz	Opened by 30 pulse
111 to 116	Lowered by 6Hz	Opened by 20 pulse
104 to 111	Regulated so that the frequency will not rise	Opened by 10 pulse
100 or lower	No correction	No correction

9-24. Optimal voltage control

The purpose of optimal voltage control is to operate the compressor at optimal voltage that meets the load detected by the power factor of the compressor.

1. Optimal

As shown on the right the efficiency (ratio of output against input) of the motor in the compressor becomes optimal when the sliding (ratio of difference between the actual number of rotation and the number of synchronous rotation of motor) is one fixed value. The value of sliding can be calculated from the power factor since the sliding and the power factor are mutually related as shown the table on the right. To make the value of sliding so that the efficiency of motor is optimal, the power factor of the compressor is detected. Then the detected power factor is controlled so that its efficiency can be high. As a result, it is possible to operate the compressor at optimal voltage.



2. How to determine the optimal voltage

Compare the detected power factor with the target power factor so that the efficiency of motor is optimal, the voltage correction value is changed and the optimal output voltage is determined.

Optimal output voltage[V]= Standard voltage at certain frequency [V]x voltage correction value(%)

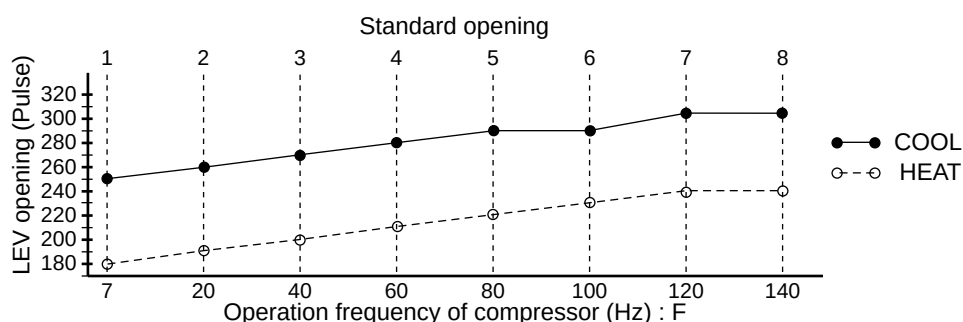
Target power factor minus detected power factor (Calculated value is supposed to be "A".)	Calculation of voltage correction value (%)
$A \leq -2\%$	Previous voltage correction value minus 1
$-2\% < A < +2\%$	Same as previous voltage correction value
$A \geq +2\%$	Previous voltage correction value plus 1

9-25. LEV control

Linear expansion valve (LEV) is controlled by "Thermostat ON" commands given from each unit.

Indoor unit status	LEV opening
Stop	Opening before stop → 500 pulse in 15 minutes
Thermostat OFF in COOL or DRY mode	Maintain LEV opening before stop → 500 pulse in 15 minutes
Thermostat ON in COOL or DRY mode	- LEV opening is determined by adding adjustment in accordance with the operation frequency: - After starting operation, adjustment in accordance with intake, discharge temperature is included in standard opening. *1 Note: LEV opening in each frequency at DRY operation and COOL operation is the same. However, velocity and compressor operation frequency controls are different.
Thermostat OFF in HEAT mode	Maintain LEV opening before stop → 500 pulse in 15 minutes.
Thermostat ON in HEAT mode	- LEV opening is determined by adding adjustment in accordance with the operation frequency: - After starting operation, opening becomes the one that adjustment in accordance with discharge temperature was added to standard opening. *1

*1 LEV opening when the outdoor unit operating: Upper limit 500 pulse, Lower limit 59 pulse.



	Standard opening							
	1	2	3	4	5	6	7	8
COOL	250	260	270	280	290	290	305	305
HEAT	180	190	200	210	220	230	240	240

- LEV opening correction by discharge temperature

The target discharge temperature is determined according to frequency zone.

Operation frequency of compressor	COOL, DRY	HEAT
Minimum ~ 20	50	50
21 ~ 33	55	55
34 ~ 46	60	55
47 ~ 59	65	60
60 ~ 72	70	65
73 ~ 85	75	70
86 ~ 98	80	75
99 ~ 111	85	80
112 ~ Maximum	90	85

The LEV opening is corrected according to difference between the target discharge temperature and discharge temperature.

Discharge temperature (°C)	LEV opening correction (pulse)	
	COOL	HEAT
more than Target discharge temperature+11	10	8
Target discharge temperature+11 to Target discharge temperature+8	4	2
Target discharge temperature+8 to Target discharge temperature+5	2	1
Target discharge temperature+5 to Target discharge temperature+2	1	1
Target discharge temperature+2 to Target discharge temperature-2	0	0
Target discharge temperature-2 to Target discharge temperature-5	-1	-1
Target discharge temperature-5 to Target discharge temperature-8	-2	-1
Target discharge temperature-8 to Target discharge temperature-11	-5	-2
Target discharge temperature-11 or less	-8	-6

9-26. Heat defrosting control

(1) Conditions to enter defrosting mode

- ①. When temperature of defrosting thermistor is -3°C or less.
 - ②. When specified non-defrosting time, is counted in the control P.C. board is satisfied.
(Total time of compressor operating)
- Going to defrosting mode at both condition of ① and ②.

(2) Defrosting operation

- ①. Compressor stops for 50 seconds, indoor fan is off and defrosting lamp lights.
- ②. 4-way valve reverses flow, Compressor operates by the frequency in heat defrosting control.
- ③. After compressor stops for 35 seconds, 4-way valve reverses flow, then defrosting finishes.

(3) Conditions to finish defrosting mode

- ①. When the defrosting thermistor temperature is 8°C or more.
 - ②. When it has spent 10 minutes for defrosting.
- Defrosting finishes at condition of ① or ②.

9-27. Discharge temperature protection control

This protection controls the compressor ON/OFF and operation frequency according to temperature of the discharge temperature thermistor.

(1) Compressor ON/OFF

When temperature of the discharge temperature thermistor exceeds 116°C, the control stops the compressor.
When temperature of the discharge temperature thermistor is 80°C or less, the controls starts the compressor.

(2) Compressor operation frequency

When temperature of the discharge temperature thermistor is expected to be higher than 116°C, the control decreases 12Hz from the current frequency.

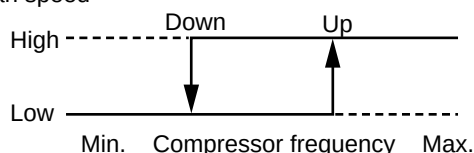
When temperature of the discharge temperature thermistor is expected to be higher than 111°C and less than 116°C, the control decreases 6Hz from the current frequency.

When temperature of the discharge temperature thermistor is expected to be higher than 104°C and less than 111°C, the control is set at the current frequency.

9-28. Outdoor fan control

Fan speed is switched according to a number of operating indoor unit and the compressor frequency.

Fan speed



<Relation between compressor frequency and fan speed>

Mode	Fan speed	Indoor unit operation	
		Single	Double
COOL	Up	60Hz	60Hz
	Down	50Hz	50Hz
HEAT	Up	60Hz	60Hz
	Down	50Hz	50Hz

Note

- When the indoor coil thermistor is 57°C or more on HEAT operation, fan speed is fixed to Low.
Or, the indoor coil thermistor is 45°C or less on HEAT operation, fan speed is back to normal.

9-29. Relation between main sensor and actuator

Relation between main sensor and actuator.

Sensor	Purpose	Actuator			
		Compressor	LEV	Outdoor fan motor	4-way valve
Discharge temperature thermistor	Protection	○	○		
Indoor pipe temperature thermistor	Defrosting Protection	○	○	○	
Defrost thermistor	Defrosting	○	○		○
Fin temperature thermistor	Protection	○		○	

10

SERVICE FUNCTIONS

MSZ-G09SV -[E1] MSZ-G12SV -[E1] MUZ-G09SV -[E1] MUZ-G12SV -[E1]
 MSZ-G09SV -[E2] MSZ-G12SV -[E2] MUZ-G09SV -[E2] MUZ-G12SV -[E2]
 MSZ-G20SV -[E1] MUZ-G20SV -[E1]

10-1. CHANGE IN DEFROST SETTING MSZ-G09/12SV-[E1], MSZ-G09/12SV-[E2]

<JS> When the JS wire of the outdoor electronic control P.C. board is cut, the defrost temperature will be changed.
 (Refer to page 92.)

Jumper wire	Change point
JS	Defrost finish temperature changes from 13°C to 15°C.

10-2. TIMER SHORT MODE

For service, set time can be shortened by short circuit of JPG and JPS the electronic control P.C. board.

The time will be shortened as follows. (Refer to page 90 or 91.)

Set time : 1-minute → 1-second

Set time : 3-minute → 3-second (It takes 3 minutes for the compressor to start operation. However, the starting time is shortened by short circuit of JPG and JPS.)

10-3. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

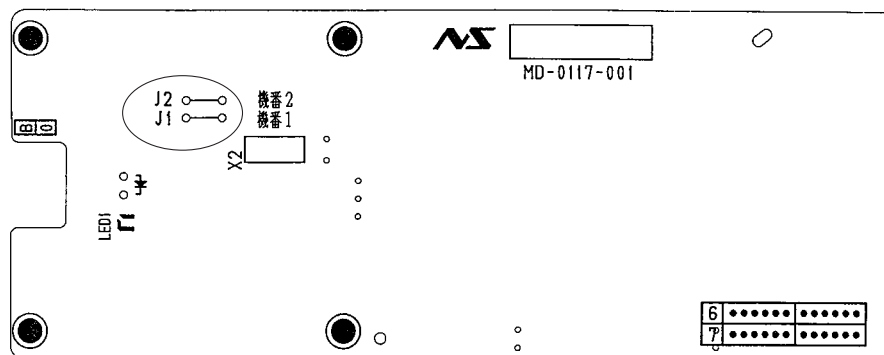
A maximum of 4 indoor units with wireless remote controllers can be used in a room.

In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the number of the indoor unit.

(1) How to modify the remote controller P.C. board MSZ-G09/12SV-[E1]

Remove batteries before modification.

The board has a print as shown below;



NOTE : For remodelling, take out the batteries and press the OPERATE/STOP(ON/OFF)button twice or 3 times at first. After finish remodelling, put back the batteries then press the RESET button.

The P.C. board has the print “J1” and “J2”. Jumper wires are mounted to each “J1” and “J2”.Cut “J1” and “J2” according to the number of indoor unit as shown in Table 1.

After modification, press the RESET button.

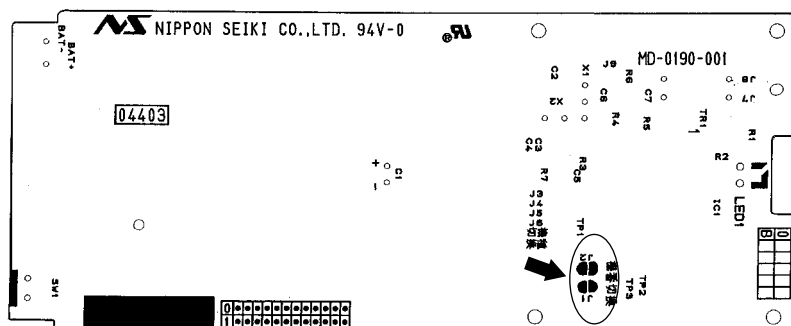
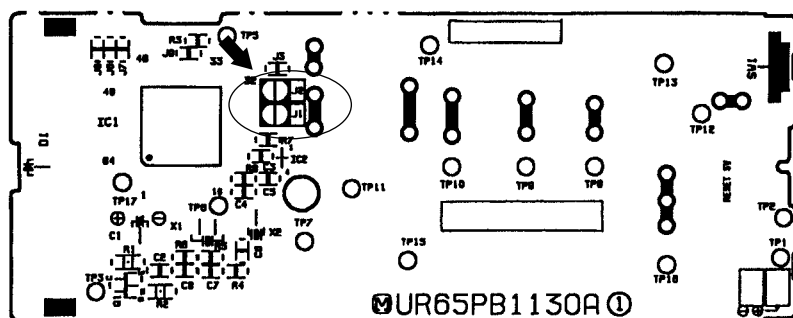
Table 1

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	—	Cut J1	Same as at left	Same as at left
No. 3 unit	—	—	Cut J2	Same as at left
No. 4 unit	—	—	—	Cut both J1 and J2

(2) How to modify the remote controller P.C. board MSZ-G09/12SV-, MSZ-G20SV-

Remove batteries before modification.

The board has a print as shown below :



NOTE : For remodelling, take out the batteries and press the OPERATE/STOP(ON/OFF)button twice or 3 times at first. After finish remodelling, put back the batteries then press the RESET button.

The P.C. board has the print “J1” and “J2”. Solder “J1” and “J2” according to the number of indoor unit as shown in Table 2. After modification, press the RESET button.

Table 2

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	—	Solder J1	Same as at left	Same as at left
No. 3 unit	—	—	Solder J2	Same as at left
No. 4 unit	—	—	—	Solder both J1 and J2

How to set the remote controller exclusively for particular indoor unit.

After you turn the breaker ON, the first remote controller that sends the signal to the indoor unit will be regarded as the remote controller for the indoor unit.

The indoor unit will only accepts the signal from the remote controller that has been assigned to the indoor unit once they are set.

The setting will be cancelled if the breaker has turned off, or the power supply has shut down.

Please conduct the above setting once again after the power has restored.

10-4. AUTO RESTART FUNCTION

When the indoor unit is controlled with the remote controller, the operation mode, the set temperature, and the fan speed are memorized by the indoor electronic control P.C. board. The "AUTO RESTART FUNCTION" sets to work the moment power has restored after power failure. Then, the unit will restart automatically.

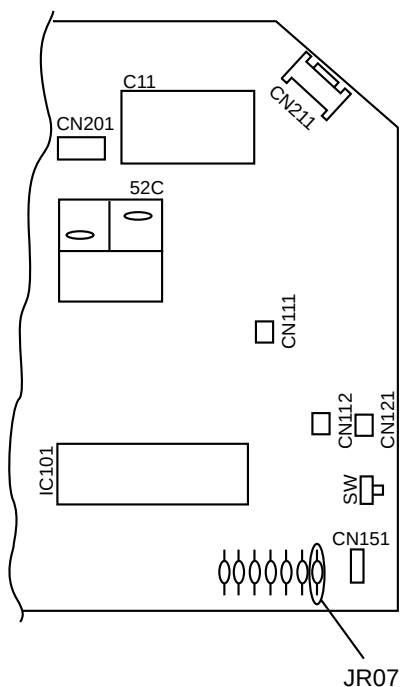
However if the unit is operated in "I FEEL CONTROL" mode before power failure, the operation is not memorized. In "I FEEL CONTROL" mode, the operation is decided by the initial room temperature.

How to set "AUTO RESTART FUNCTION"

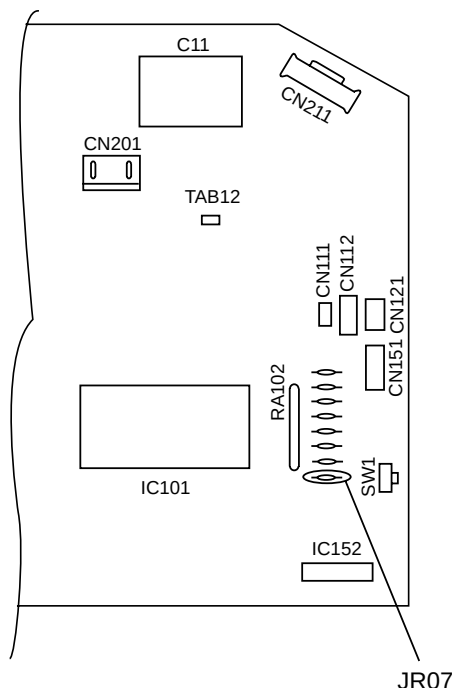
- ① Turn off the main power for the unit.
- ② Pull out the indoor electronic control P.C. board and the display P.C.board. (Refer to page 97 or 99.)
- ③ Cut the RESISTOR JR07 on the indoor electronic control P.C.board. (Refer to page 90 or 91.)

MSZ-G09SV -[E1] MSZ-G12SV -[E1]

MSZ-G09SV -[E2] MSZ-G12SV -[E2]



MSZ-G20SV -[E1]



Operation

- ① If the main power (230V AC) has been cut, the operation settings remain.
- ② After the power is restored, the unit restarts automatically according to the memory. (However, it takes at least 3 minutes for the compressor to start running.)

NOTE:

- The operation settings are memorized when 10 seconds have passed after the indoor unit was operated with the remote controller.
- If main power is turned OFF or a power failure occurs while AUTO START/STOP timer is active, the timer setting is cancelled.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliance not to turn on at the same time.
- When some air conditioners are connected to the same supply system, if they are operated before power failure, the starting current of all the compressors may flow simultaneously at restart. Therefore, the special counter-measures are required to prevent the main voltage-drop or the rush of the starting current by adding to the system that allows the units to start one by one.

MSZ-G09SV -[E1] MSZ-G12SV -[E1] MUZ-G09SV -[E1] MUZ-G12SV -[E1]
 MSZ-G09SV -[E2] MSZ-G12SV -[E2] MUZ-G09SV -[E2] MUZ-G12SV -[E2]
 MSZ-G20SV -[E1] MUZ-G20SV -[E1]

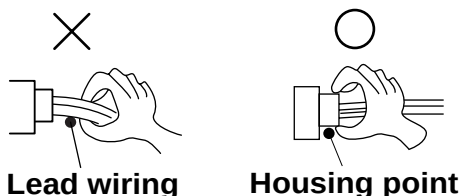
11-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

- 1) Check the power supply voltage.
- 2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.

- 1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the main unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
- 2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
- 3) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
- 4) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



3. Troubleshooting procedure

- 1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
- 2) Before servicing check that the connector and terminal are connected properly.
- 3) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
- 4) When troubleshooting, refer to the flow chart on page 67 ~68 and the check table on page 69 ~ 73.

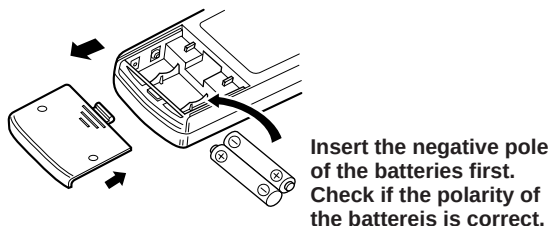
4. How to replace batteries

Weak batteries may cause the remote controller malfunction.

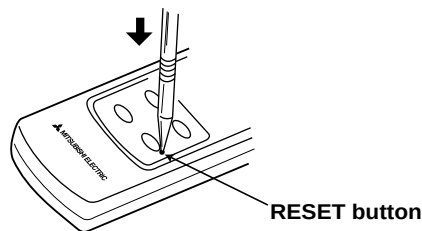
In this case, replace the batteries to operate the remote controller normally.

<MSZ-G09/12SV -[E1]>

- ① Remove the back lid and insert batteries. Then reattach the back lid.



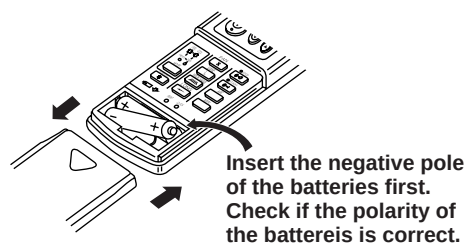
- ② Press the RESET button with tip end of ball point pen or the like, and then use the remote controller.



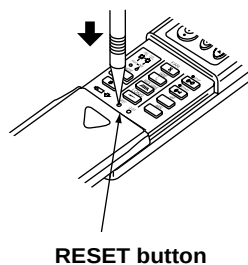
< MSZ-G09/12SV -[E2], MSZ-G20SV -[E1]>

In these illustrations remote controller of MSZ-G20SV -[E1] is used.

- ① Remove the front lid and insert batteries. Then reattach the front lid.



- ② Press the RESET button with tip end of ball point pen or the like, and then use the remote controller.

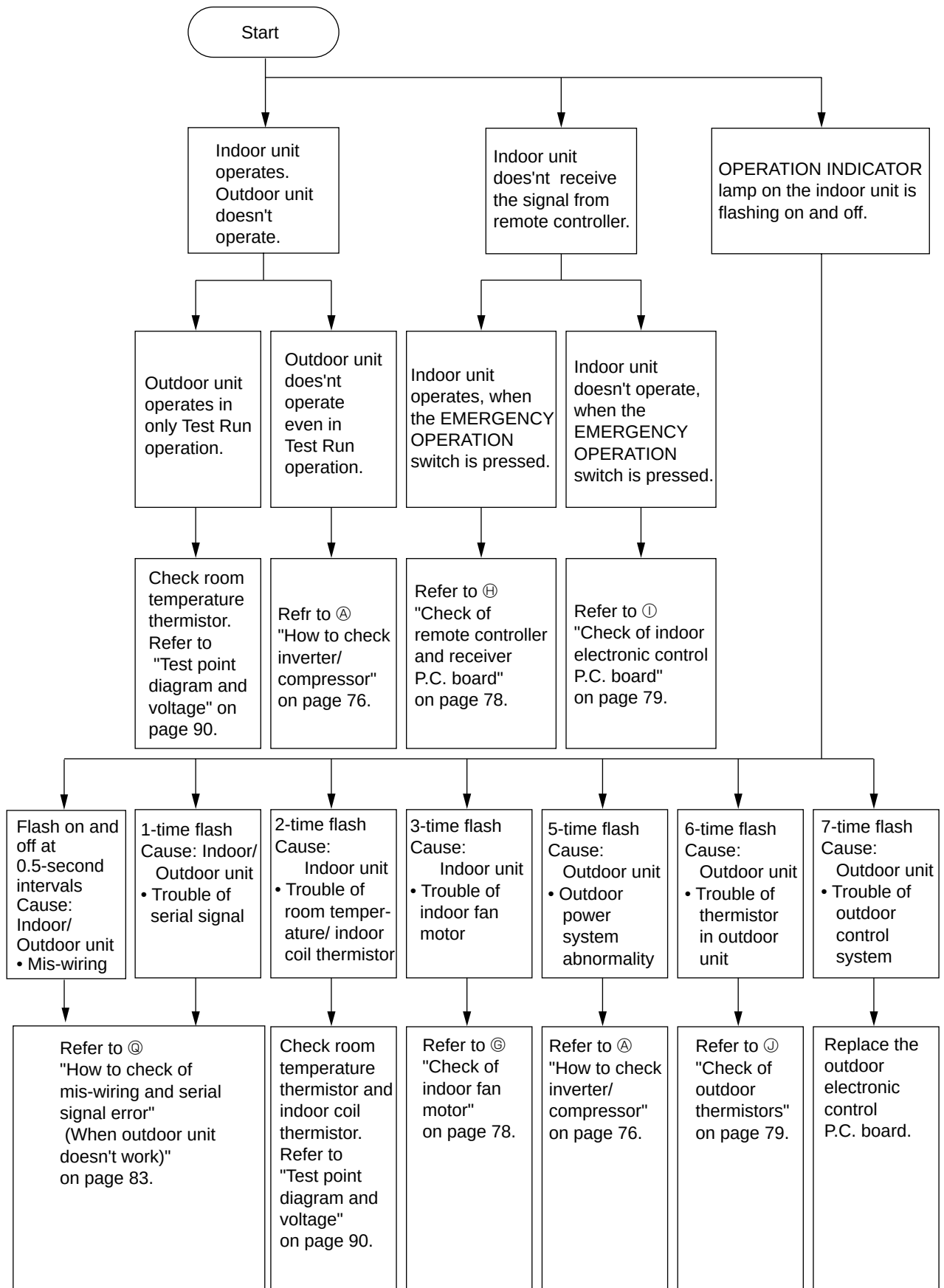


NOTE : If the RESET button is not pressed, the remote controller may not operate correctly.

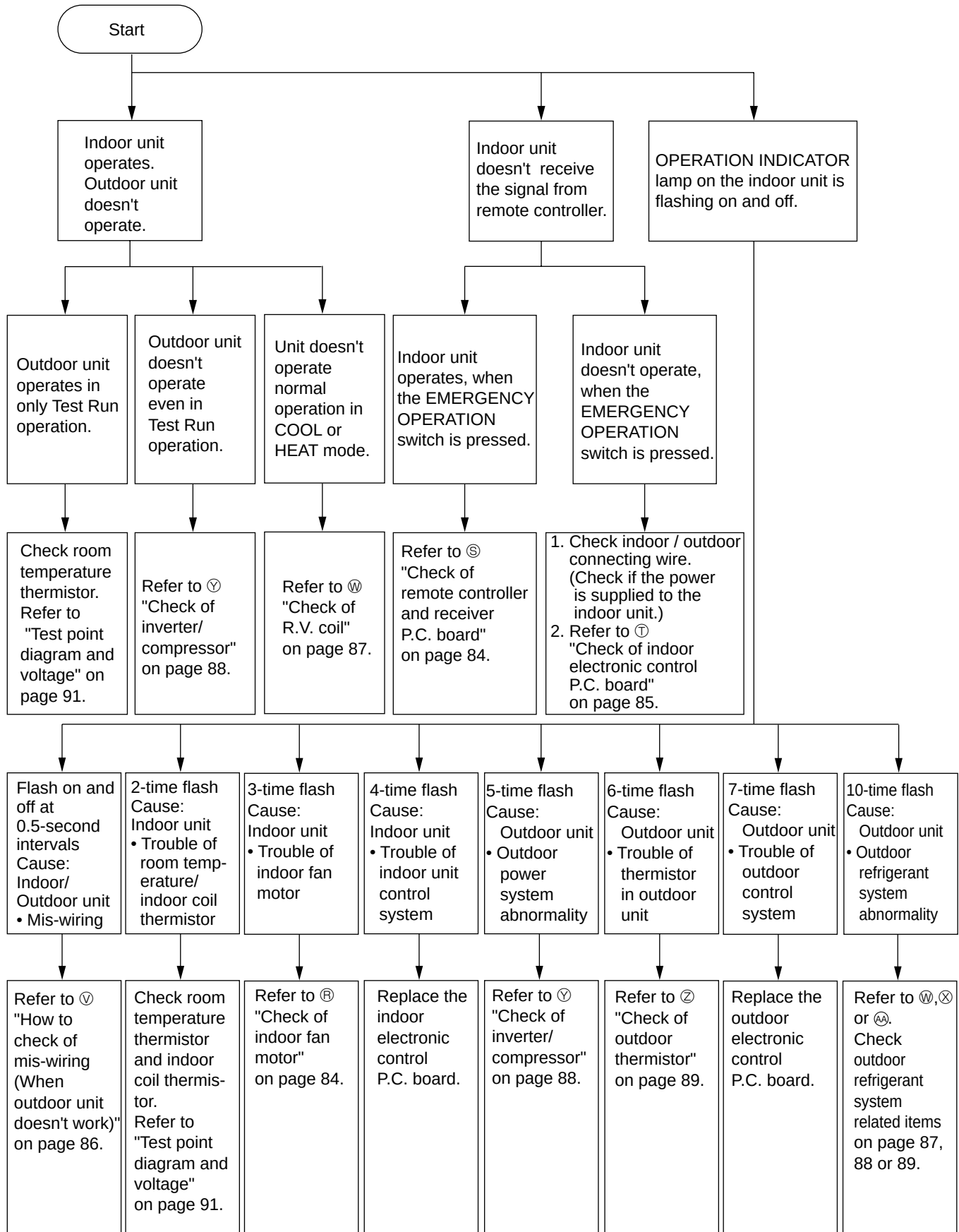
11-2. Instruction of troubleshooting

MSZ-G09SV -[E1] MSZ-G12SV -[E1]

MSZ-G09SV -[E2] MSZ-G12SV -[E2]



MSZ-G20SV -E1



1. Troubleshooting check table

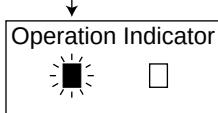
INDOOR UNIT

MSZ-G09SV -[E1] MSZ-G12SV -[E1]

MSZ-G09SV -[E2] MSZ-G12SV -[E2]

•The following indication applies regardless of shape of the indicator.

flashing



- Flashing of the OPERATION INDICATOR lamp (on the left-hand side) indicates possible abnormalities.
- The OPERATION INDICATOR lamp (on the left-hand side) is lighting during normal operation.

NOTE: Before taking measures, make sure that the symptom reappears, for accurate troubleshooting.
Self check table

No.	Abnormal point	Operation indicator lamp	Symptom	Detection method	Checkpoint
1	Mis-Wiring	0.5-second ON ●○○○○○ 0.5-second OFF	Outdoor unit does not operate.	When indoor electronic control P.C. board does not receive serial signals for 4 to 5 seconds with OPERATION/ STOP(ON/ OFF) button of remote controller ON and 52C contactor ON for the first time. NOTE: In case of serial signal error, mis-wiring indication will appear by turning power off and then turning it back on.	• Refer to ⑩ "How to check mis-wiring and serial signal error" on page 83.
※2	Serial signal	1-time flash ●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	When indoor electronic control P.C. board does not receive serial signals from outdoor unit for 4 to 5 seconds,	
※3	Indoor coil thermistor Room temperature thermistor	2-time flash ●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	Detect Indoor coil/room temperature thermistor short or open circuit every 8 seconds during operation.	• Refer to the characteristics of indoor coil thermistor, sub indoor coil thermistor, and room temperature thermistor on page 90.
※4	Indoor fan motor	3-time flash ●●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	When rotational frequency feedback signal is not emit during 12-second indoor fan operation.	• Refer to ⑩ "Check of indoor fan motor" on page 78.
5	Outdoor power system	5-time flash ●●●●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	When compressor has stopped due to over current protection or start-up failure protection 3 times in a row within 1 minute after start-up.	• Refer to ④ "How to check inverter/ compressor" on page 76.
6	Outdoor thermistors	6-time flash ●●●●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	<Thermistor short> Thermistors are abnormal when they short after compressor start-up. <Thermistor open> Thermistors are abnormal when they open after compressor start-up. However, discharge temperature thermistor is abnormal when open circuit is detected more than 10 minutes after compressor start-up.	• Shortage of refrigerant • Replace the outdoor control P.C. board. Refer to ⑩ "Check of outdoor thermistors" on page 79.
7	Outdoor control system	7-time flash ●●●●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	When it cannot properly read data in the nonvolatile memory of outdoor electronic control P.C. board.	• Replace the outdoor electronic control P.C. board.

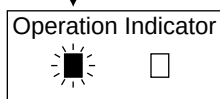
NOTE : ※ When the indoor unit has started operation and the above detection method has detected an abnormality (the first detection after the power ON), the indoor electronic control P.C. board turns OFF the 52C and the indoor fan motor with the OPERATION INDICATOR lamp lighting.
When the 52C and the indoor fan motor are turned ON again 3 minutes later and the same abnormality is detected (a second detection of the above abnormality after the power ON), the indoor electronic control P.C. board turns OFF the 52C and the indoor fan motor with the OPERATION INDICATOR lamp flashing.
However, the first detection is cleared in case the power is turned OFF after the first detection.

INDOOR UNIT

MSZ-G20SV -[E]

•The following indication applies regardless of shape of the indicator.

flashing



- Flashing of the OPERATION INDICATOR lamp (on the left-hand side) indicates possible abnormalities.
- The OPERATION INDICATOR lamp (on the left-hand side) is lighting during normal operation.

NOTE: Before taking measures, make sure that the symptom reappears, for accurate troubleshooting.
Self check table

No.	Abnormal point	Operation indicator lamp	Symptom	Detection method	Checkpoint
1	Mis-Wiring	0.5-second ON ●○○○○○ 0.5-second OFF	Outdoor unit does not operate.	3 minutes after power supply turns ON, when serial signal is not received.	• Refer to ⑦ "How to check mis-wiring" on page 86.
2	Indoor coil thermistor Room temperature thermistor	2-time flash ●●○○○○○●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	Detect Indoor coil/room temperature thermistor short or open circuit every 8 seconds during operation.	• Refer to the characteristics of indoor coil thermistor, sub indoor coil thermistor, and room temperature thermistor on page 91.
3	Indoor fan motor	3-time flash ●●○○○○○●●○○○○○●●○○○○○ 2.5-second OFF	Indoor fan repeats 12 seconds ON and 3 minutes OFF. When the indoor fan breaks, the fan keeps stopping.	When rotational frequency feedback signal is not emit during 12-second indoor fan operation.	• Refer to ⑧ "Check of indoor fan motor" on page 84.
4	Indoor control system	4-time flash ●●○○○○○●●○○○○○●●○○○○○●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	When it cannot properly read data in the nonvolatile memory of indoor electronic control P.C. board.	• Replace the indoor electronic control P.C. board.
5	Outdoor power system	5-time flash ●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	When compressor has stopped due to over current protection or start-up failure protection 3 times in a row within 5 seconds after start-up.	• Refer to ⑨ "Check of inverter/compressor" on page 88.
6	Outdoor thermistors	6-time flash ●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	<Thermistor short> Thermistors are abnormal when they short after compressor start-up. <Thermistor open> Thermistors are abnormal when they open after compressor start-up. However, discharge temperature thermistor is abnormal when open circuit is detected more than 10 minutes after compressor start-up.	• Shortage of refrigerant • Replace the outdoor control P.C. board. Refer to ② "Check of outdoor thermistor" on page 89.
7	Outdoor control system	7-time flash ●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	When it cannot properly read data in the nonvolatile memory of outdoor electronic control P.C. board.	• Replace the outdoor electronic control P.C. board.
8	Low discharge temperature protection	10-time flash ●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○●●○○○○○ 2.5-second OFF	Outdoor unit does not operate.	When discharge temperature has been 50°C or less on cool operation, or is 49°C or less on heat operation for 20 minutes.	• Refer to ⑩, ⑪ or ⑫. Check refrigerant system related items on page 87, 88 or 89. • Check refrigerant circuit and refrigerant amount.

NOTE : When the indoor unit has started operation and the above detection method has detected an abnormality (the first detection after the power ON), the indoor electronic control P.C. board turns OFF the indoor fan motor with the OPERATION INDICATOR lamp flashing.

OUTDOOR UNIT

MUZ-G09SV -[E1] MUZ-G12SV -[E1]

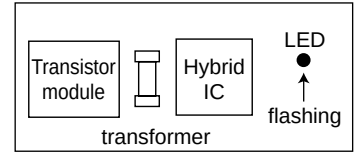
MUZ-G09SV -[E2] MUZ-G12SV -[E2]

NOTE 1. The location of LED is illustrated at the right figure.

2. LED lights up during normal operation.

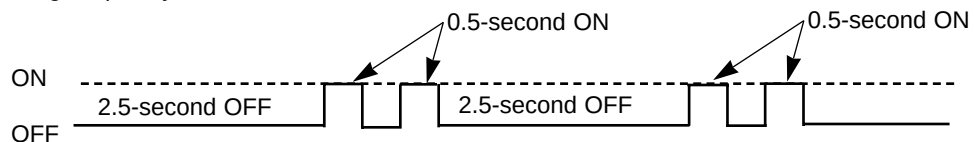
Refer to page 92.

<Outdoor electronic control P.C. board>



No.	Symptom	LED indication	Abnormal point	Detection method	Checkpoint
1	Outdoor unit does not operate	1-time flash every 2.5 seconds NOTE: For abnormality location, refer to 'Indoor troubleshooting check table' on page 69.	Serial signal	When serial signal stops from indoor unit for 60 seconds, compressor stops and then restarts 3 minutes later.	· Refer to ㉔ "How to check mis-wiring and serial signal error" on page 83. · Refer to ㉓ "Check of power supply" on page 81.
2			Outdoor power system	When compressor has stopped by over current protection within 1 minute after compressor start-up 3 times in a row, compressor stops and then restarts 3 minutes later.	· Refer to ㉔ "How to check inverter/compressor" on page 76.
3			Outdoor thermistors	When discharge temperature thermistor or fin temperature thermistor shorts or opens during compressor running, compressor stops and restarts 3 minutes later.	· Refer to ㉔ "Check of outdoor thermistors" on page 79.
4			Outdoor control system	When nonvolatile memory date cannot be read properly, compressor stops and restarts 3 minutes later.	Replace outdoor electronic control P.C. board.
5	'Outdoor unit stops and restarts 3 minutes later' is repeated	2-time flash 2.5 seconds OFF	Over current protection	When 19A(MUZ-G09SV)/ 29A(MUZ-G12SV) current flows into power transistor, compressor stops and restarts 3 minutes later.	Refer to ㉔ "How to check inverter/compressor" on page 76.
6		3-time flash 2.5 seconds OFF	Discharge temperature overheat protection	When discharge temperature thermistor exceeds 116℃, compressor stops and restarts 3 minutes later. (Compressor restarts when discharge temperature thermistor reads 100℃ or below.)	· Check refrigerant circuit and refrigerant amount. · Refer to ㉔ "Check of outdoor thermistors" on page 79.
7		4-time flash 2.5 seconds OFF	Fin temperature thermistor overheat protection	When temperature at heat sink exceeds 78℃(MUZ-G09SV)/ 80℃(MUZ-G12SV) or outdoor electronic control P.C. board exceeds 68℃(MUZ-G09SV)/ 78℃(MUZ-G12SV), compressor stops and restarts 3 minutes later.	· Check around outdoor unit. · Check outdoor unit air passage.
8		5-time flash 2.5 seconds OFF	High pressure protection	When indoor coil thermistor exceeds 75℃, compressor stops and restarts 3 minutes later.	· Check refrigerant circuit and refrigerant amount. · Check stop valve.
9	Outdoor unit operates (at low frequency)	1-time flash 2.5 seconds OFF	Frequency drop by current protection	When current from power outlet exceeds 8A(MUZ-G09SV)/ 9A(MUZ-G12SV), compressor frequency lowers.	The unit is normal, but check the following. · Check if indoor filters are clogged · Check if refrigerant is short. · Check if indoor/outdoor unit air outlets are short cycled.
10		3-time flash 2.5 seconds OFF	Frequency drop by high pressure protection	When indoor coil thermistor exceeds 55℃ in HEAT mode, compressor frequency lowers.	
		Frequency drop by defrosting in COOL mode	When indoor coil thermistor reads 8℃ or below in COOL mode, compressor frequency lowers.		
11	4-time flash 2.5 seconds OFF	Frequency drop by, discharge temperature protection.	When discharge temperature thermistor exceeds 111℃, compressor frequency lowers.		
12	Outdoor unit operates	5-time flash 2.5 seconds OFF	Outdoor thermistors. Defrost thermistor.	When defrost thermistor short or open. ※ In this case, compressor continues running.	Refer to ㉔ "Check of outdoor thermistors" on page 79.
13		6-time flash 2.5 seconds OFF	Power factor detection	When power factor of compressor is not detected. ※ In this case, compressor continues running.	Check compressor wiring.
14		7-time flash 2.5 seconds OFF	Low discharge temperature protection	When discharge temperature has been 50℃ or below for 20 minutes.	· Refer to ㉔ "Check of LEV" on page 82. · Check refrigerant circuit and refrigerant amount.

The flashing frequency shows the number of times the LED blinks after every 2.5-second OFF.
(Example) When the flashing frequency is "2".



OUTDOOR UNIT

MUZ-G20SV -E1

LED 1 (red)	LED 2 (yellow)	Error mode
Lighting	Lighting	Normal

Refer to page 93.

NOTE: When both LED lamps are not lighting, check if the power is supplied to the unit. Refer to “U” on page 85.

Symptom: Outdoor unit does not operate.				
Indication		Abnormal point	Detecting method	Check points
LED 1 (red)	LED 2 (Yellow)			
Lighting	2-time	Outdoor power system	When the compressor operation has been interrupted by overcurrent protection continuously three times within 1 minute after start-up.	Check the inverter / compressor. Refer to “V” on page 88.
Lighting	7-time	Outdoor control system	When the nonvolatile memory data cannot be read properly on the outdoor electronic control P.C. board.	Replace the outdoor electronic control P.C. board.
Lighting	9-time	DC voltage sensing circuit	When DC voltage sensing circuit detects 57V or below or 395V or above	Replace the outdoor electronic control P.C. board.

Symptom: Outdoor unit repeats to stop and restart in 3 minutes				
Indication		Abnormal point	Detecting method	Check points
LED 1 (red)	LED 2 (Yellow)			
Lighting	3-time	Discharge temperature thermistor	When a short or open circuit occurs in the discharge temperature thermistor during compressor running.	- Check the characteristic of the discharge temperature thermistor. Refer to “Z” on page 89. - Check the connector. (CN663)
Lighting	4-times	Fin temperature thermistor	When a short or open circuit occurs in the fin temperature thermistor during compressor running.	- Check the characteristic of the fin temperature thermistor. Refer to “Z” on page 89. - Check the connector. (CN664)
Lighting	5-times	P.C. board temperature thermistor	When a short or open circuit occurs in the P.C. board temperature thermistor during compressor running.	Replace the outdoor electronic control P.C. board.
2-time	Not lighting	Over current protection	When over current is applied to the power module.	- Check the inverter / compressor. Refer to “V” on page 88. - Check the amount of gas. - Check the indoor / outdoor air flow for short cycle. - Check the indoor unit air filter for clogging.
3-time	Not lighting	Discharge temperature overheat protection	When the discharge temperature thermistor detects 116°C or above. (Protection will be released at 100°C or below.)	- Check the amount of gas and the refrigerant cycle. - Check the outdoor unit air passage.
4-time	Not lighting	Fin temperature overheat protection	When the fin temperature thermistor detects 91°C or above.	- Check the outdoor unit air passage. - Check the outdoor fan motor. Refer to “A” on page 89. - Check the power module.
4-time	Not lighting	P.C. board temperature overheat protection	When the P.C. board temperature thermistor detects 79°C or above.	- Check the outdoor unit air passage. - Check the outdoor fan motor. Refer to “A” on page 89. - Replace the outdoor electronic control P.C. board.



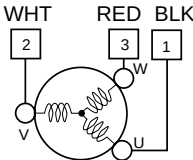
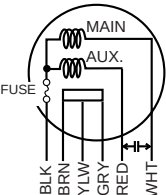
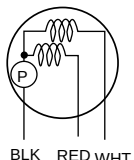
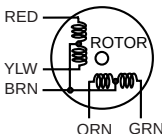
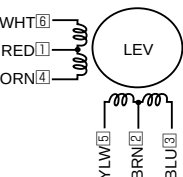
Symptom: Outdoor unit operates (The compressor operates at reduced frequency)				
Indication		Abnormal point	Detecting method	Check points
LED 1 (red)	LED 2 (Yellow)			
1-time	Lighting	Current protection	When the outdoor unit input current exceeds 15.5A.	These symptoms do not mean any abnormality of the product, but check the following points. • Air filter clogging. • Amount of gas. • Short cycle of indoor / outdoor air flow.
2-time	Lighting	Overload protection	When the compressor load exceed the specified value.	
3-time	Lighting	High pressure protection	When indoor pipe temperature exceeds 55℃ during heating.	
3-time	Lighting	Defrosting in cooling	When indoor pipe temperature falls to 6℃ or below during cooling.	
4-time	Lighting	Discharge temperature protection	When the discharge temperature exceeds 111℃.	
7-time	Lighting	Low discharge temperature protection	When the state with low discharge temperature of which 50.4℃ or below in cool and 48.8℃ or below in heat for 20 minutes.	

Symptom: Outdoor unit operates				
Indication		Abnormal point	Detecting method	Check points
LED 1 (red)	LED 2 (Yellow)			
5-time	Lighting	Defrost thermistor	When a short or open circuit occurs in the defrost thermistor during heating.	• Check the characteristic of the defrost temperature thermistor. Refer to "②" on page 89. • Check the connector. (CN663)
6-time	Lighting	Power factor detection	When the compressor power factor cannot be detected.	• Check the compressor wiring.

2. Trouble criterion of main parts

MSZ-G09SV -[E1] **MSZ-G12SV** -[E1] **MUZ-G09SV** -[E1] **MUZ-G12SV** -[E1]

MSZ-G09SV -[E2] **MSZ-G12SV** -[E2] **MUZ-G09SV** -[E2] **MUZ-G12SV** -[E2]

Part name	Check method and criterion			Figure										
Room temperature thermistor(RT11)	Measure the resistance with a tester. (Part temperature 10°C ~ 30°C)													
Indoor coil thermistor (RT12(main), RT13(sub))	Normal 8 kΩ ~ 20 kΩ	Abnormal Open or short-circuit												
Defrost thermistor (RT61)	Measure the resistance with a tester. (Part temperature -10°C ~ 40°C)													
	Normal 5 kΩ ~ 55 kΩ	Abnormal Open or short-circuit												
Discharge temperature thermistor(RT62)	Measure the resistance with a tester. Before measurement, hold the thermistor with your hands to warm it up. (Part temperature 0°C ~ 40°C)													
	Normal 150 kΩ ~ 600 kΩ	Abnormal Open or short-circuit												
Fin temperature thermistor(RT64)	Measure the resistance with a tester. Before measurement, hold the thermistor with your hands to warm it up. (Part temperature 0°C ~ 40°C)													
	Normal 30 kΩ ~ 180 kΩ	Abnormal Open or short-circuit												
Compressor(MC)	Measure the resistance between the terminals with a tester. (Part temperature -10°C ~ 40°C)													
	<table><tr><td></td><td colspan="2">Normal</td><td rowspan="2">Abnormal</td></tr><tr><td></td><td>MUZ-G09SV</td><td>MUZ-G12SV</td></tr><tr><td>U-V U-W V-W</td><td>1.88 Ω ~ 2.31Ω</td><td>0.39 Ω ~ 0.49 Ω</td><td>Open or short-circuit</td></tr></table>		Normal		Abnormal		MUZ-G09SV	MUZ-G12SV	U-V U-W V-W	1.88 Ω ~ 2.31Ω	0.39 Ω ~ 0.49 Ω	Open or short-circuit		
	Normal		Abnormal											
	MUZ-G09SV	MUZ-G12SV												
U-V U-W V-W	1.88 Ω ~ 2.31Ω	0.39 Ω ~ 0.49 Ω	Open or short-circuit											
Indoor fan motor(MF)	Motor part	Measure the resistance between the terminals with a tester. (Part temperature 10°C ~ 30°C)												
INNER FUSE 136± 3°C CUT OFF	Sensor part	Color of lead wire	Normal		Abnormal									
		WHT - BLK	280 Ω ~ 304 Ω		Open or short-circuit									
		BLK - RED	312 Ω ~ 338 Ω											
		Measure the voltage power ON.												
		Color of lead wire	Normal	Abnormal										
		BRN - YLW	4.5 ~ 5.5V	Remain 0V or 5V										
		YLW - GRY	(When fan revolved one time) 0V→5V→0V (Approx.)											
Outdoor fan motor(MF61) INNER PROTECTOR 135± 5°C OPEN 95± 15°C CLOSE	Measure the resistance between the terminals with a tester. (Part temperature -10°C ~ 40°C)													
	Color of lead wire	Normal			Abnormal									
		MUZ-G09SV	MSZ-G12SV		Open or short-circuit									
	WHT - BLK	246 Ω ~ 301Ω	177 Ω ~ 217 Ω											
	BLK - RED	174 Ω ~ 214 Ω	308 Ω ~ 378 Ω											
Horizontal vane motor(MV1) Vertical vane motor(MV2)	Measure the resistance between the terminals with a tester. (Part temperature 10°C ~ 30°C)													
	Color of lead wire	Normal	Abnormal											
	BRN-other one	282 Ω ~ 306 Ω	Open or short-circuit											
R.V. coil(21S4)	Measure the resistance between the terminals with a tester. (Part temperature -10°C ~ 40°C)													
	Normal 2.6 kΩ ~ 3.3 kΩ	Abnormal Open or short-circuit												
LEV(Expansion valve)	Measure the resistance with a tester. (Part temperature : -10°C ~ 40°C)													
	Color of lead wire	Normal	Abnormal											
	WHT - RED	39 Ω ~ 56 Ω	Open or short-circuit											
	RED - ORN													
	YLW - BRN													
	BRN - BLU													

(P) : INNER PROTECTOR

MSZ-G20SV -[E1] MUZ-G20SV -[E1]

Part name	Check method and criterion			Figure	
Room temperature thermistor(RT11)	Measure the resistance with a tester. (Part temperature 10℃ ~ 30℃)				
Indoor coil thermistor (RT12(main), RT13(sub))	Normal 8 kΩ ~ 20 kΩ	Abnormal Open or short-circuit			
Defrost thermistor (RT62)	Measure the resistance with a tester. (Part temperature -10℃ ~ 40℃)				
	Normal 5 kΩ ~ 60 kΩ	Abnormal Open or short-circuit			
Discharge temperature thermistor(RT61)	Measure the resistance with a tester. Before measurement, hold the thermistor with your hands to warm it up. (Part temperature 20℃ ~ 40℃)				
	Normal 100 kΩ ~ 300 kΩ	Abnormal Open or short-circuit			
Fin temperature thermistor(RT67)	Measure the resistance with a tester. Before measurement, hold the thermistor with your hands to warm it up. (Part temperature 0℃ ~ 40℃)				
	Normal 20 kΩ ~ 200 kΩ	Abnormal Open or short-circuit			
Compressor(MC)	Measure the resistance between the terminals with a tester. (Part temperature -10℃ ~ 40℃)				
	Normal 1Each phase 0.39Ω ~ 0.50Ω	Abnormal Open or short-circuit			
Indoor fan motor(MF) INNER PROTECTOR 135± 5℃ OPEN 86± 15℃ CLOSE	Motor part	Measure the resistance between the terminals with a tester. (Part temperature 10℃ ~ 30℃)			
		Color of lead wire	Normal		Abnormal
		WHT – BLK	133 Ω ~ 144 Ω		Open or short-circuit
	BLK – RED	153 Ω ~ 165 Ω			
	Sensor part	Measure the voltage power ON.			Remain 0V or 5V
Color of lead wire		Normal			
BRN – YLW		4.5 ~ 5.5V (When fan revolved one time) 0V→5V→0V (Approx.)			
Outdoor fan motor(MF61) INNER PROTECTOR 135± 5℃ OPEN 87± 15℃ CLOSE	Color of lead wire	Normal	Abnormal		
		WHT – BLK	208.4 Ω ~ 254.8 Ω		Open or short-circuit
		BLK – YLW	42.4 Ω ~ 51.9 Ω		
		BLK – RED	197.7 Ω ~ 241.7 Ω		
	Measure the resistance between the terminals with a tester. (Part temperature -10℃ ~ 40℃)				
Horizontal vane motor(MV1) Vertical vane motor(MV2)	Measure the resistance between the RED terminals and other ones. (Part temperature 10℃ ~ 30℃)				
	Normal Approx. 300Ω in each phase	Abnormal Open or short-circuit			
R.V. coil(21S4)	Measure the resistance between the terminals with a tester. (Part temperature -10℃ ~ 40℃)				
	Normal 2.673 kΩ ~ 3.268 kΩ	Abnormal Open or short-circuit			
LEV(Expansion valve)	Measure the resistance with a tester. (Part temperature : -10℃ ~ 40℃)				
	Color of lead wire	Normal	Abnormal		
	WHT – RED	30.3 Ω ~ 37.0 Ω	Open or short-circuit		
	RED – ORN				
	YLW – BRN				
	BRN – BLU				

Ⓟ : INNER PROTECTOR

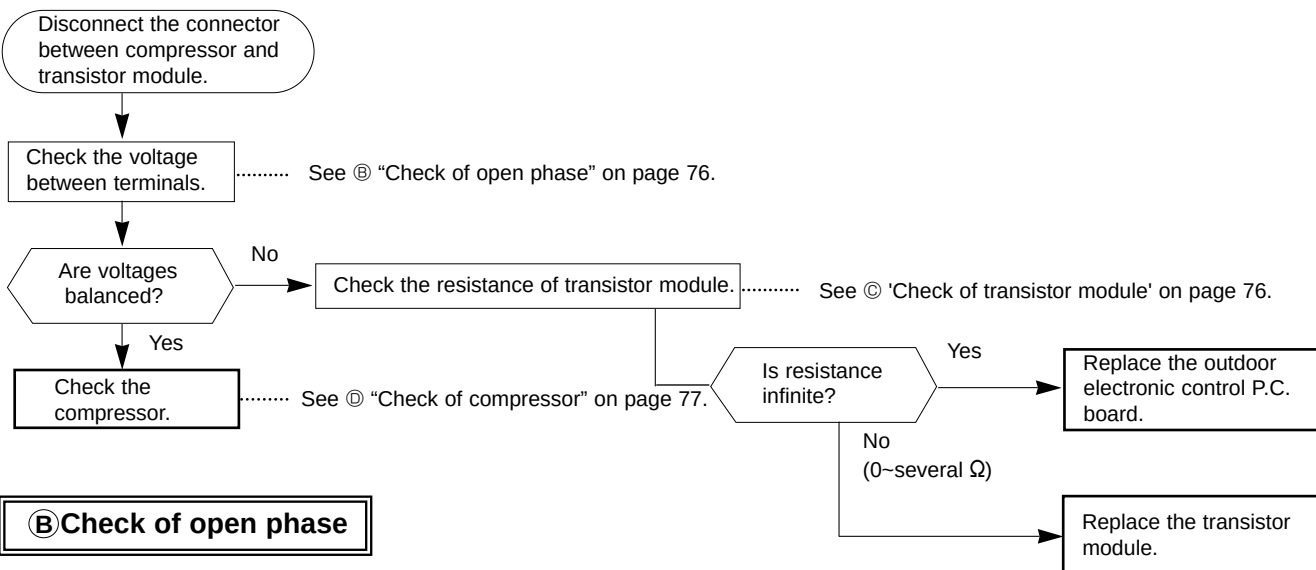
MSZ-G09SV -E1 MSZ-G12SV -E1 MUZ-G09SV -E1 MUZ-G12SV -E1

MSZ-G09SV -E2 MSZ-G12SV -E2 MUZ-G09SV -E2 MUZ-G12SV -E2

Ⓐ on page 76 ~ Ⓚ on page 83

When OPERATION INDICATOR lamp flashes 5-time.
Outdoor unit does not operate.

Ⓐ How to check inverter/ compressor



Ⓑ Check of open phase

- Be sure to use the analog voltmeter for measurement.
- With the connector between compressor and transistor module disconnected, activate the inverter and measure the balance of voltage between terminals.

Model	Operation mode	Operational frequency [Hz]	Output voltage [V]
MSZ-G09SV	COOL	79	190
	HEAT	58	155
MSZ-G12SV	COOL	85	190
	HEAT	58	155

<< Operation method >>

Start heating operation by pressing the EMERGENCY OPERATION switch on the indoor unit. (test-run mode)

<< Measurement point >>

at 3 points

BLK-WHT

BLK-RED

WHT-RED

* Measure AC voltage between the lead wires at 3 points.

<< Judgment >>

Balanced Normal

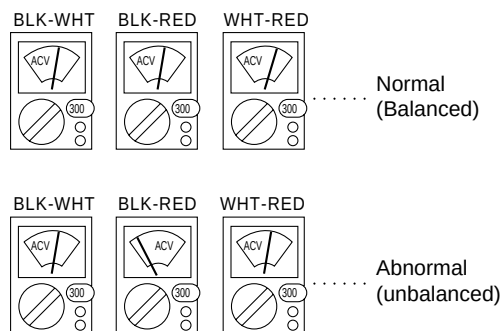
Unbalanced Abnormal (open phase)

Shutdown by overcurrent Abnormal (short)

NOTE 1. Measure AC voltage, at 3 points more than one minute after the outdoor fan motor starts running.

2. The output voltage values in above table have tolerance within ±20%.

Voltmeter indication



Ⓒ Check of transistor module

- Disconnect the connector between compressor and transistor module, and measure resistance between terminals on the transistor module.

<< Measurement point >>

at 6 points

BLK-WHT, WHT-BLK

BLK-RED, RED-BLK

WHT-RED, RED-WHT

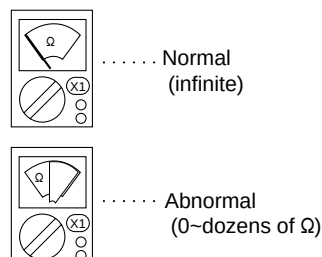
* Measure resistance between the lead wires at 3 points

<< Judgment >>

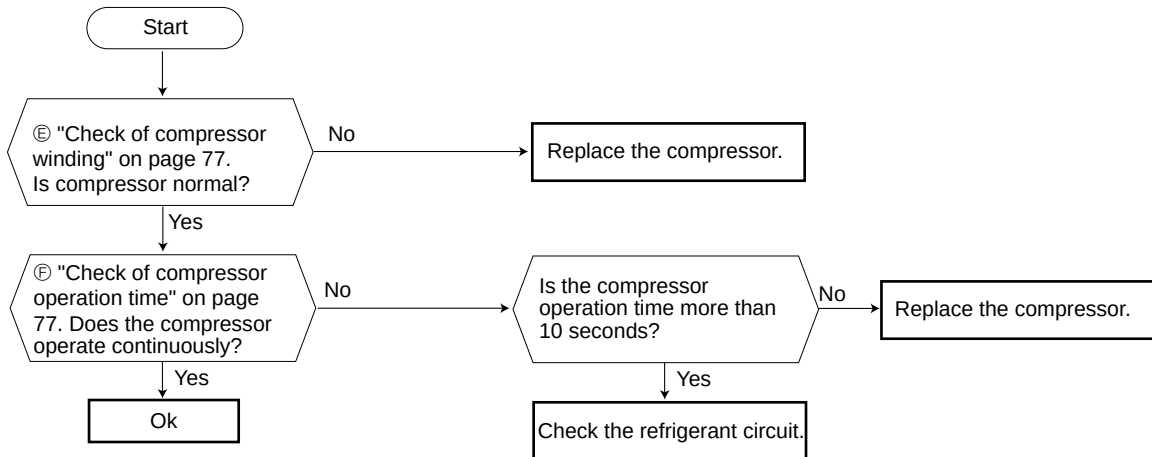
Infinite [Ω] Normal

0~dozens of Abnormal (short)

ohmmeter indication



④ Check of compressor



⑤ Check of compressor winding

- Disconnect the connector between compressor and transistor module, and measure resistance between the compressor terminals.

<<Measurement point>>

at 3 points

BLK-WHT

BLK-RED

WHT-RED

* Measure resistance between the lead wires at 3 points.

<<Judgment>>

1.88 to 2.31Ω(MUZ-G09SV)/ 0.39 to 0.50Ω(MUZ-G12SV) at -10°C to 40°C of part temperature

0[Ω] Abnormal [short]

Infinite[Ω] Abnormal [open]

NOTE 1. Be sure to zero the ohmmeter before measurement.

2. Winding resistance for each phase is 2.14Ω(MUZ-G09SV)/ 0.45Ω(MUZ-G12SV) at 20°C.

Ohmmeter indication



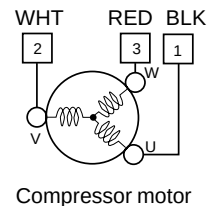
..... Normal
(1~several Ω)



..... Abnormal
(0Ω short)



..... Abnormal
(infinite..... open)



⑥ Check of compressor operation time

- Connect the compressor and activate the inverter. Then measure the time until the inverter stops due to over current.

<<Operation method>>

Start heating or cooling operation by pressing the EMERGENCY OPERATION switch on the indoor unit. (Test-run mode)

<<Measurement>>

Measure the time from the start of outdoor fan running till the stop of the inverter due to over current.

<<Judgment>>

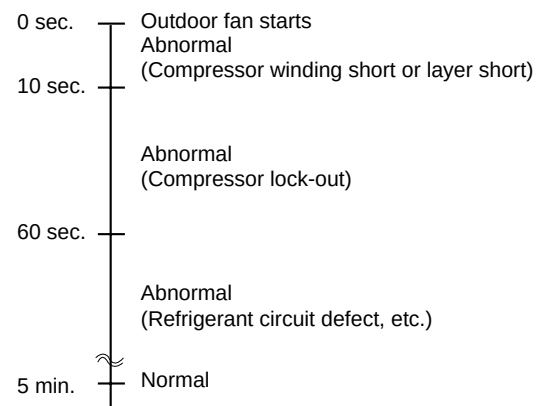
For reference

0~10 seconds..... Abnormal (short)

10~60 seconds..... Abnormal (compressor lock-out)

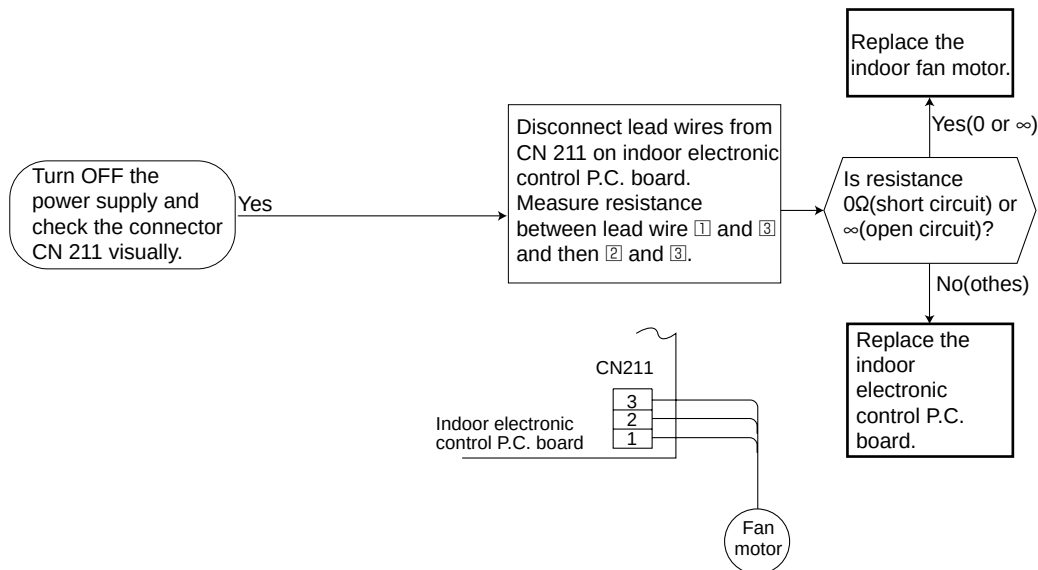
60 seconds~5 minutes..... Abnormal (refrigerant circuit defect)

more than 5 minutes..... Normal



When OPERATION INDICATOR lamp flashes 3-time.
Indoor fan does not operate.

G Check of indoor fan motor

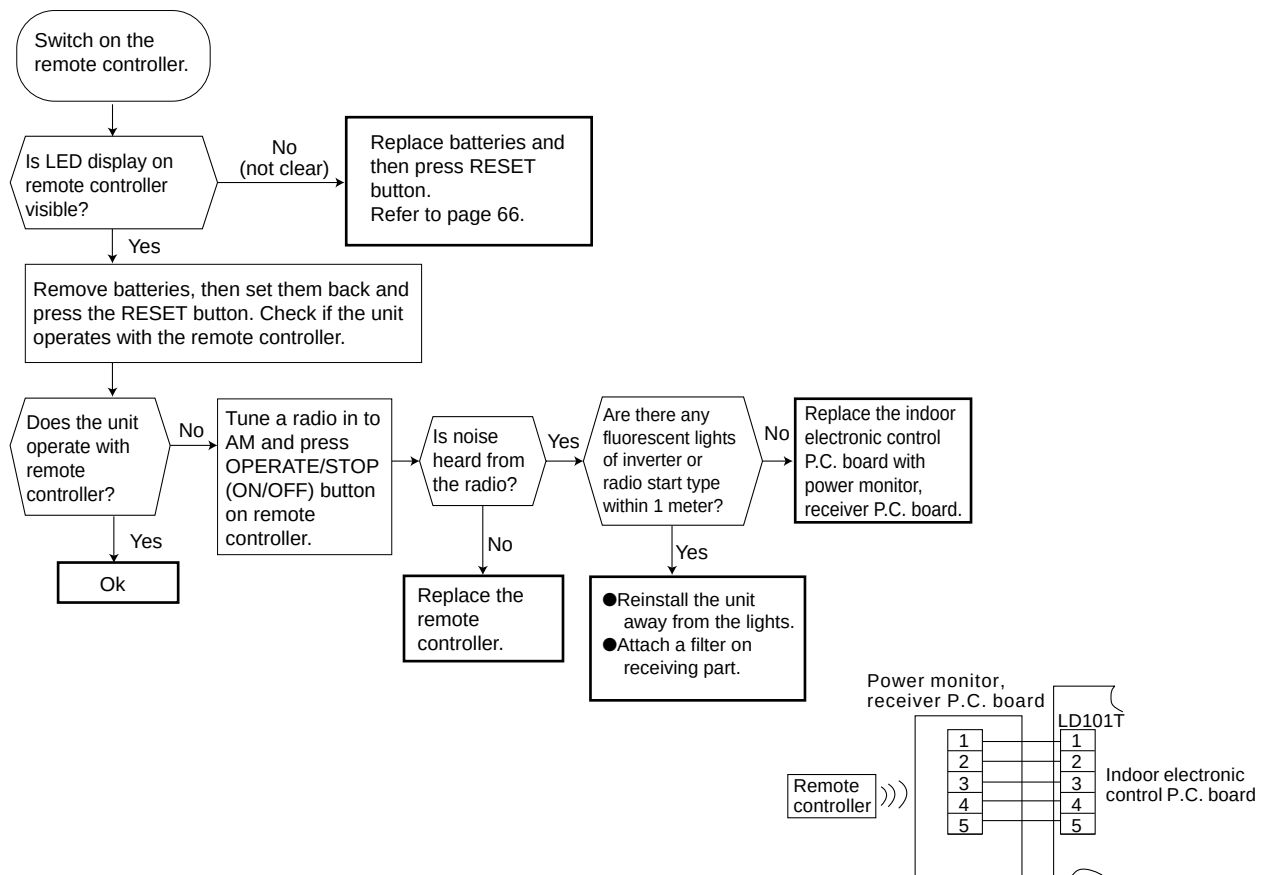


Indoor unit operates by pressing the EMERGENCY OPERATION switch, but does not operate with the remote controller.

H Check of remote controller and receiver P.C. board

*Check if the remote controller is exclusive for this air conditioner.

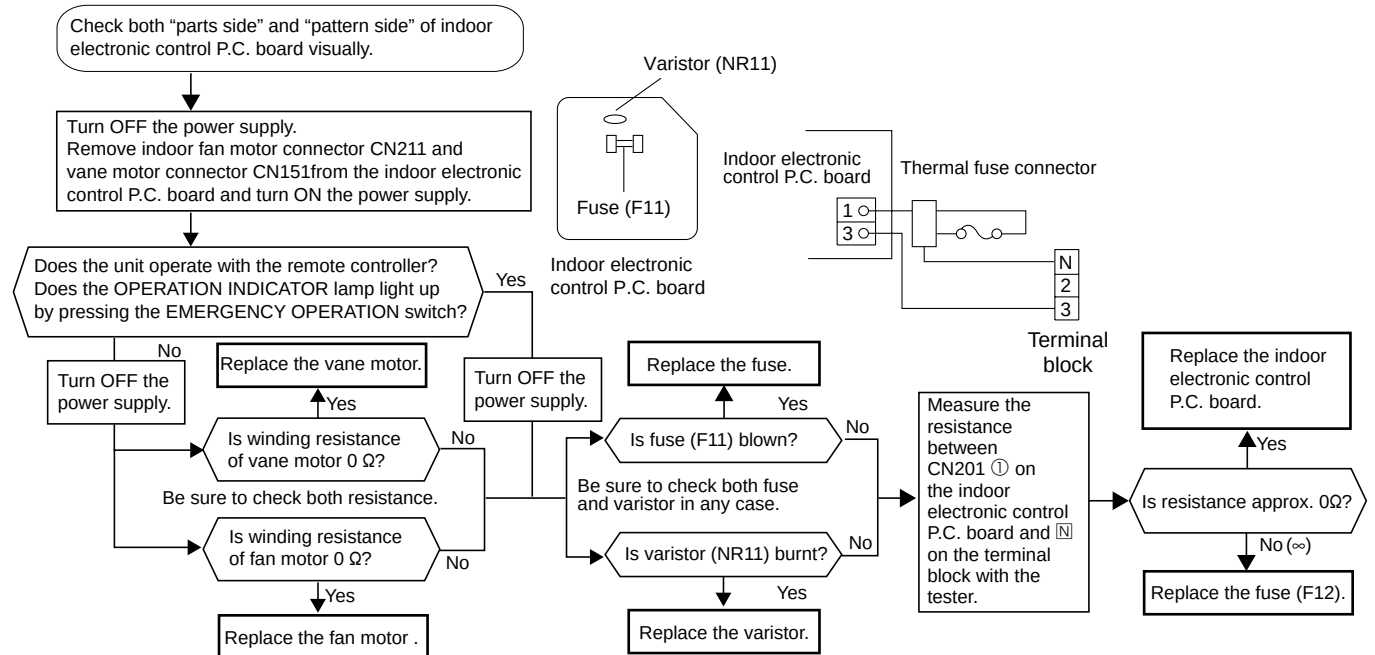
*In case of replacing the receiver P.C. board, replace the indoor electronic control P.C. board with it because they are unified.



The unit doesn't operate with the remote controller.

Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.

① Check of indoor electronic control P.C. board



When OPERATION INDICATOR lamp flashes 6-time.

The thermistors in the outdoor unit are abnormal.

② Check of outdoor thermistors

Disconnect the connectors CN 641 and CN 642 from the outdoor electronic control P.C. board.
(Check the characteristics of each thermistor.)

Defrost thermistor RT61

Measure resistance between CN 641① and ②.

Discharge temperature thermistor RT62

Measure resistance between CN 641③ and ④.

Fin temperature thermistor RT64

Measure resistance between CN 642① and ②.

Does the resistance of the thermistor have the characteristics on page 92?

Replace the thermistor.

① Connect CN 641 and CN 642.

② Disconnect the connector between the compressor and transistor module.

Turn ON the power supply to indoor unit and press the EMERGENCY OPERATION switch.

Replace the outdoor electronic control P.C. board.

Does the unit operate 10 minutes or more?

Is LED in the outdoor electronic control P.C. board flashing 5 minutes?

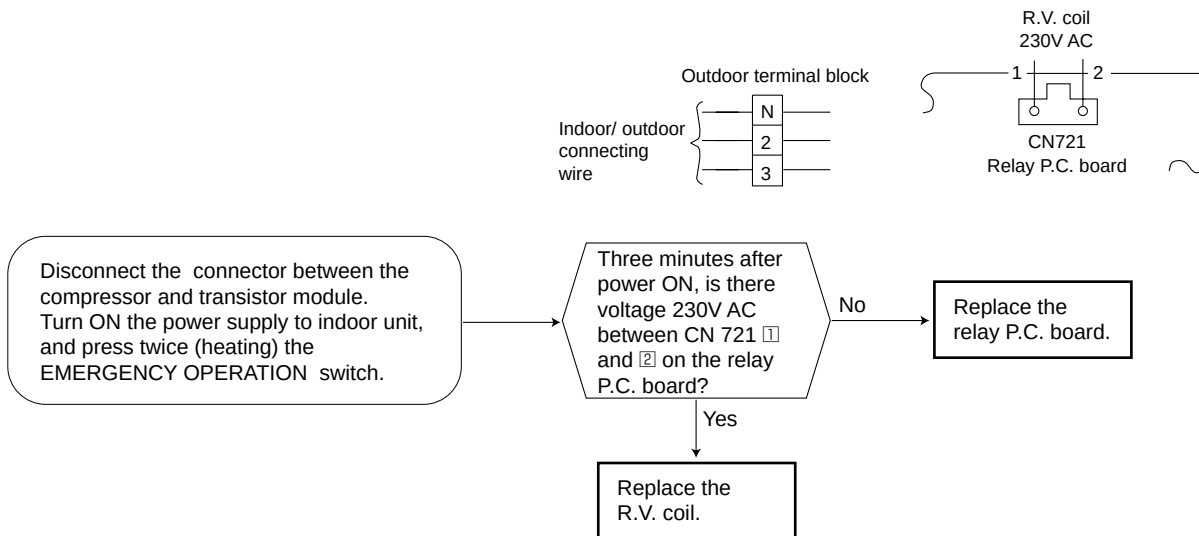
Reconnect the connector

Cooling operates when heating is expected.

Ⓚ Check of R.V. coil

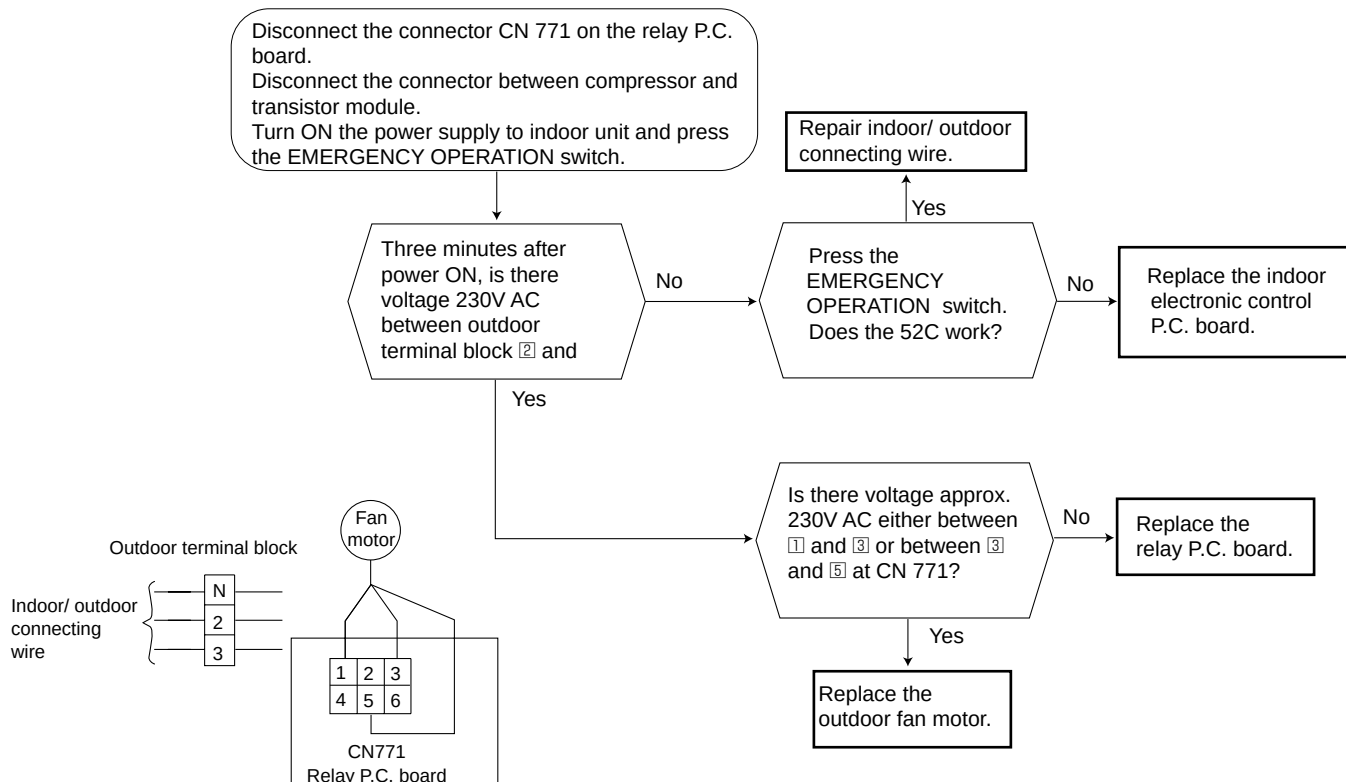
First, measure resistance of the R.V. coil to check if it is defective or not.

The voltage occurs between the terminals even when the control is OFF, the connector CN 721 is not connected or the R.V. coil is open



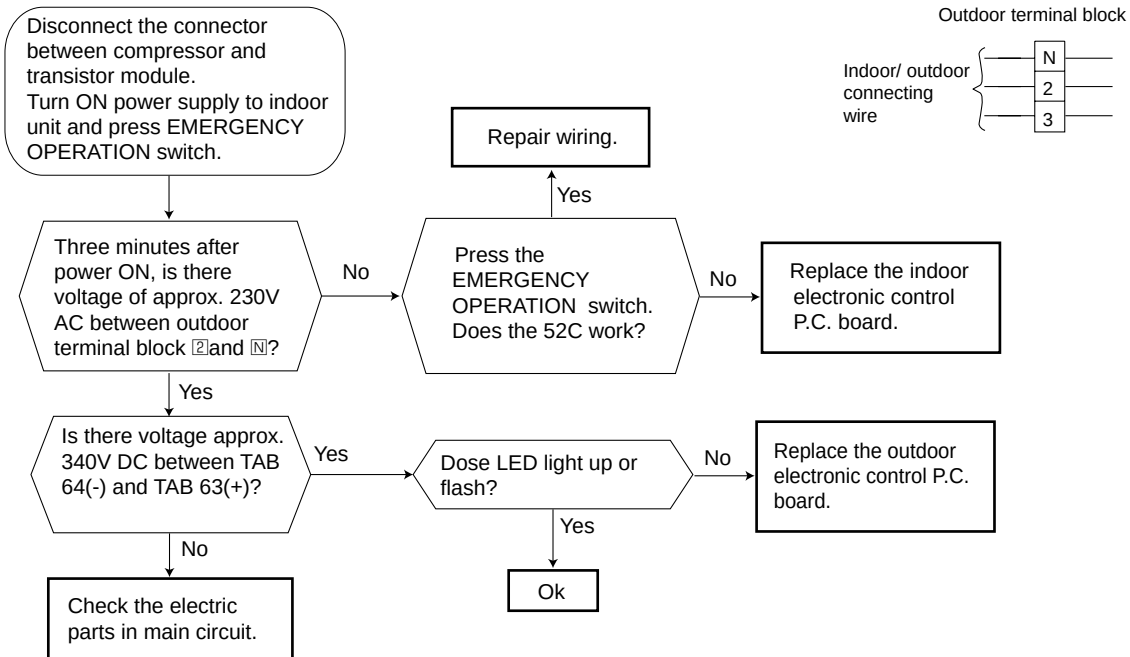
Outdoor fan motor does not work.

Ⓛ Check of outdoor fan motor

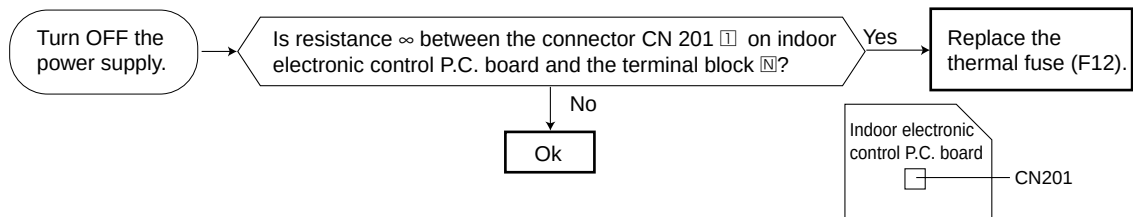


Inverter does not work.

M Check of power supply



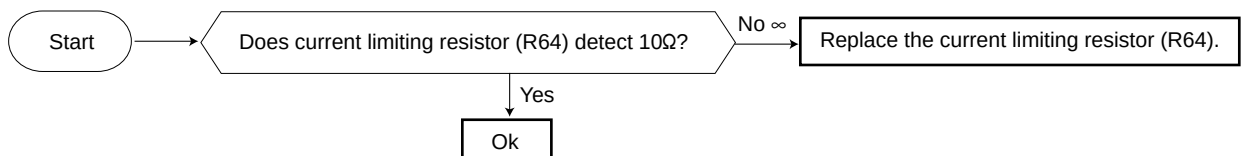
N Check of thermal fuse



Outdoor unit does not operate at all or stops immediately due to over current.

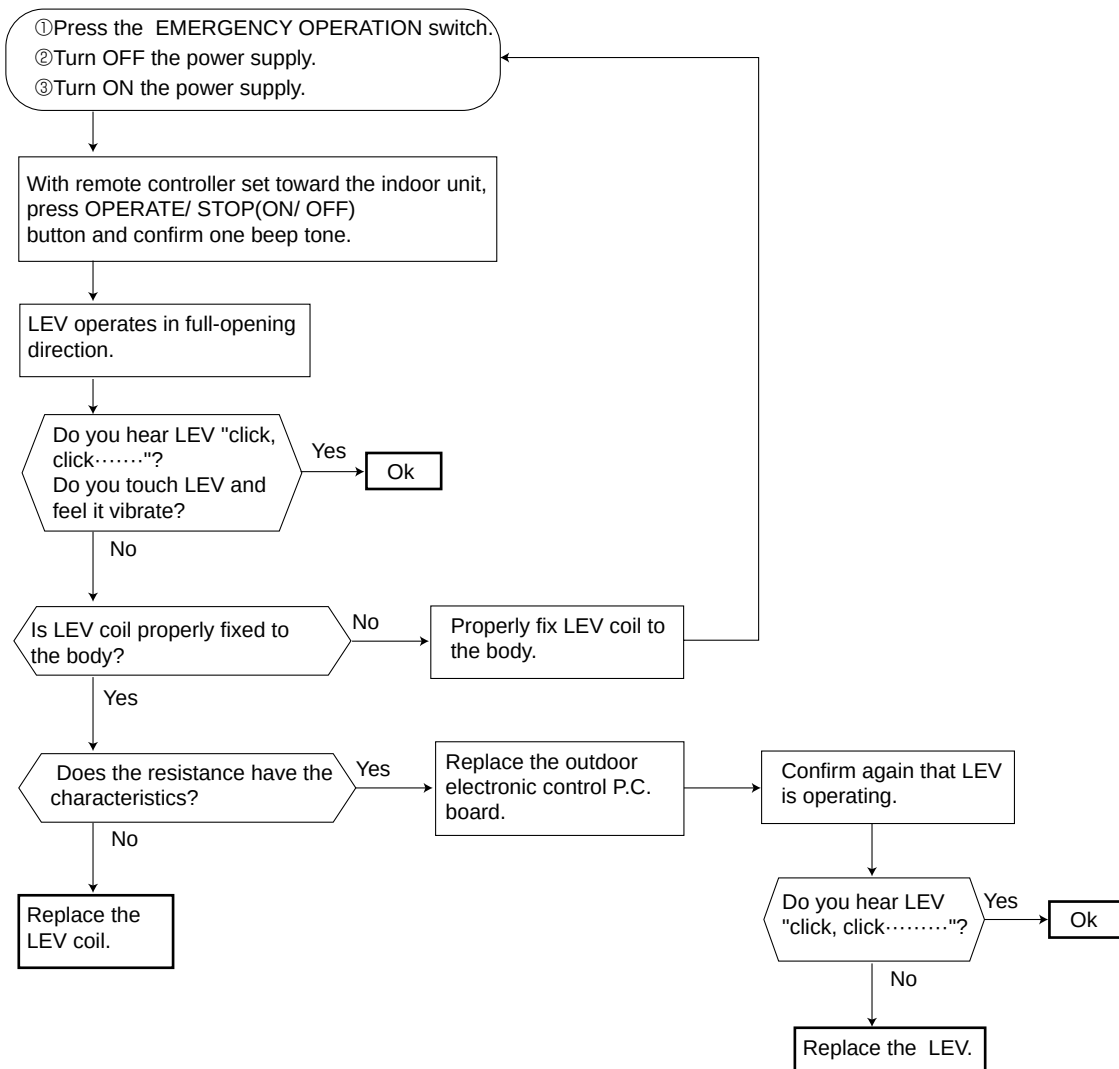
O Check of rush current limiting circuit

When the current limiting resistor is open, the rush current limiting relay may not be working properly.
Therefore confirm the limiting resistor works properly after replacing it.



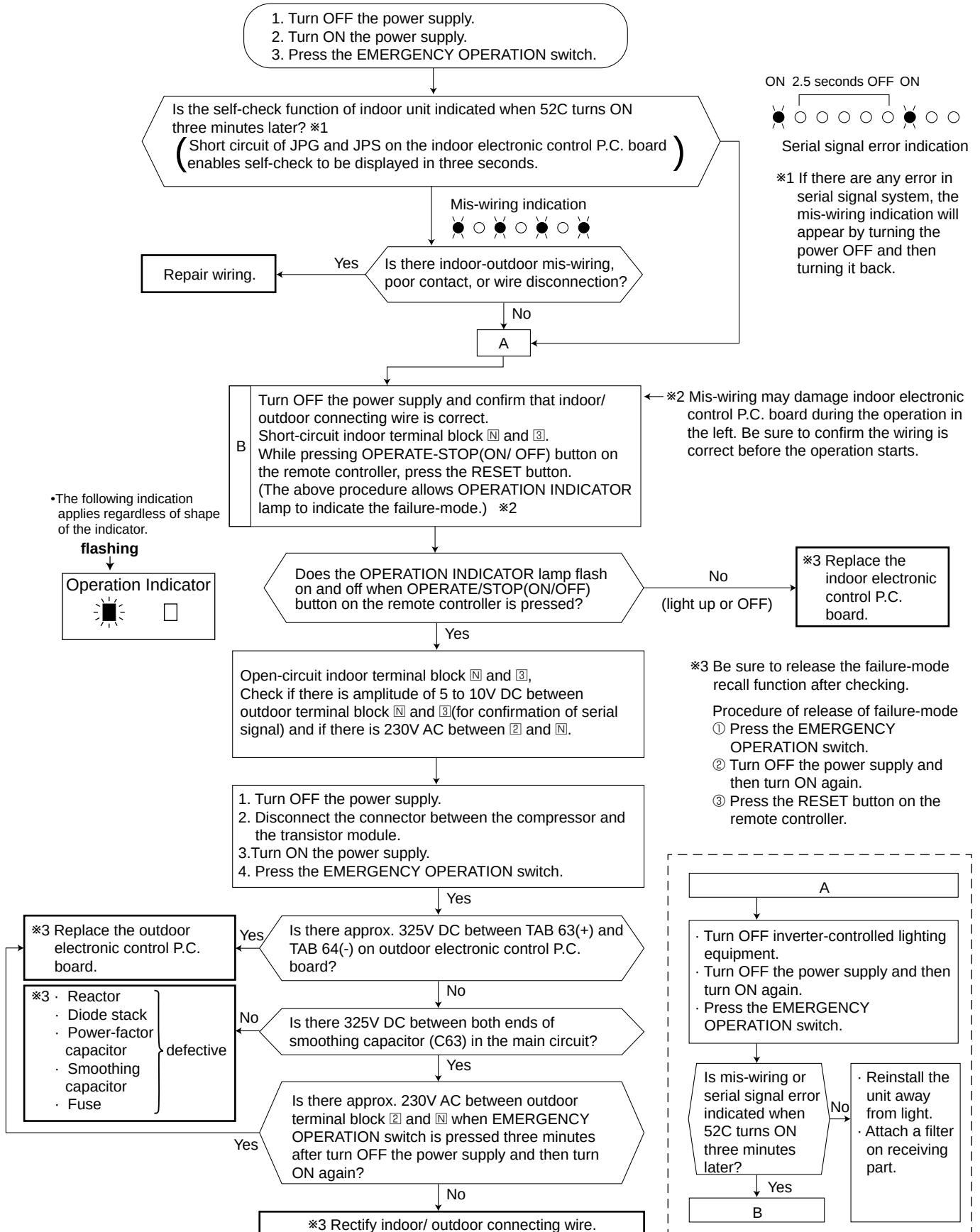
Heating/Cooling does not operate.

P Check of expansion valve (LEV)



When OPERATION INDICATOR lamp flashes ON and OFF in every 0.5-second or flashes once.
Outdoor unit doesn't operate.

Q How to check mis-wiring and serial signal error

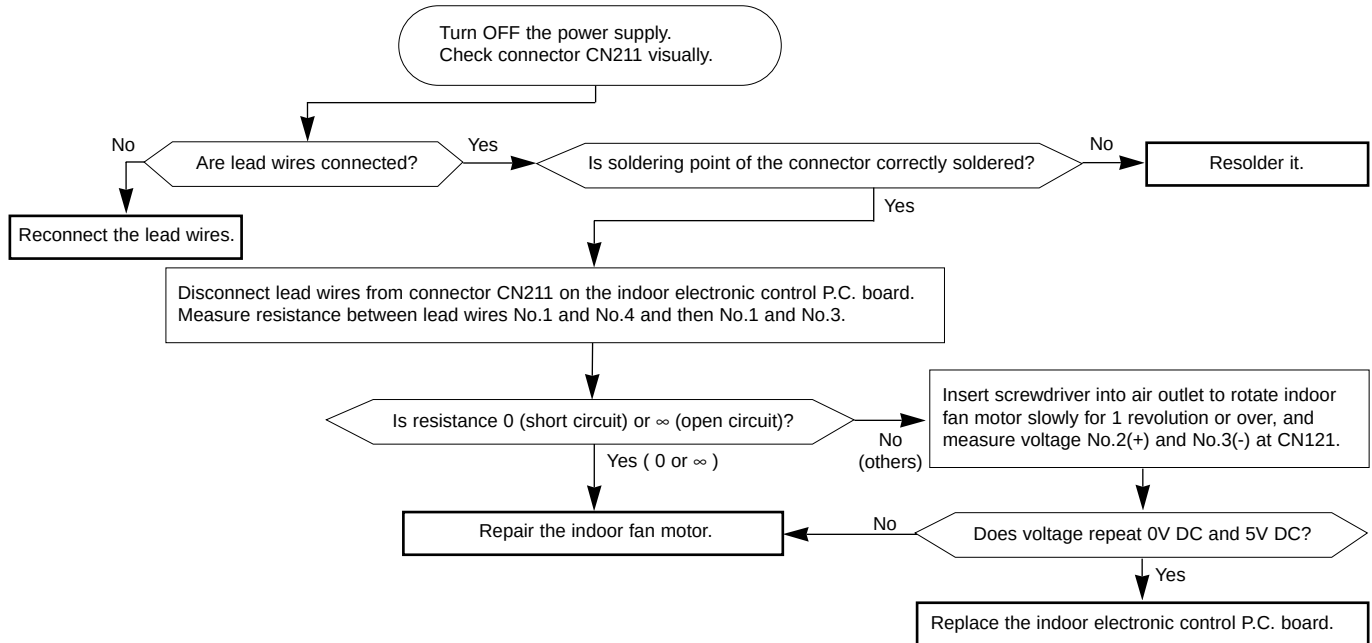


MSZ-G20SV -[E1] MUZ-G20SV -[E1] (R) on page 84 ~ (AA) on page 89

When OPERATION INDICATOR lamp flashes 3-time.

Indoor fan doesn't operate.

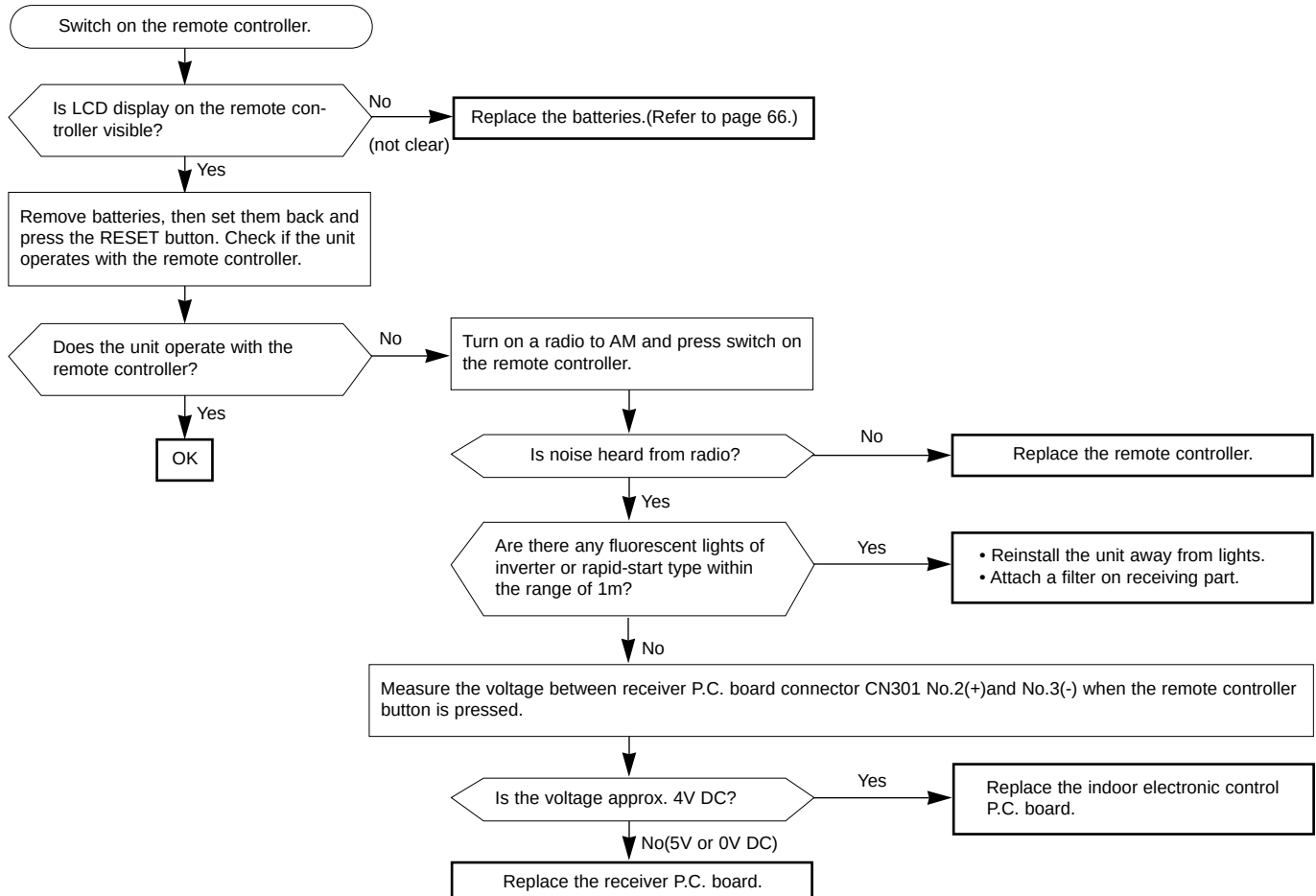
(R) Check of indoor fan motor



Indoor unit operates by pressing the EMERGENCY OPERATION switch, but doesn't operate with the remote controller.

(S) Check of remote controller and receiver P.C. board

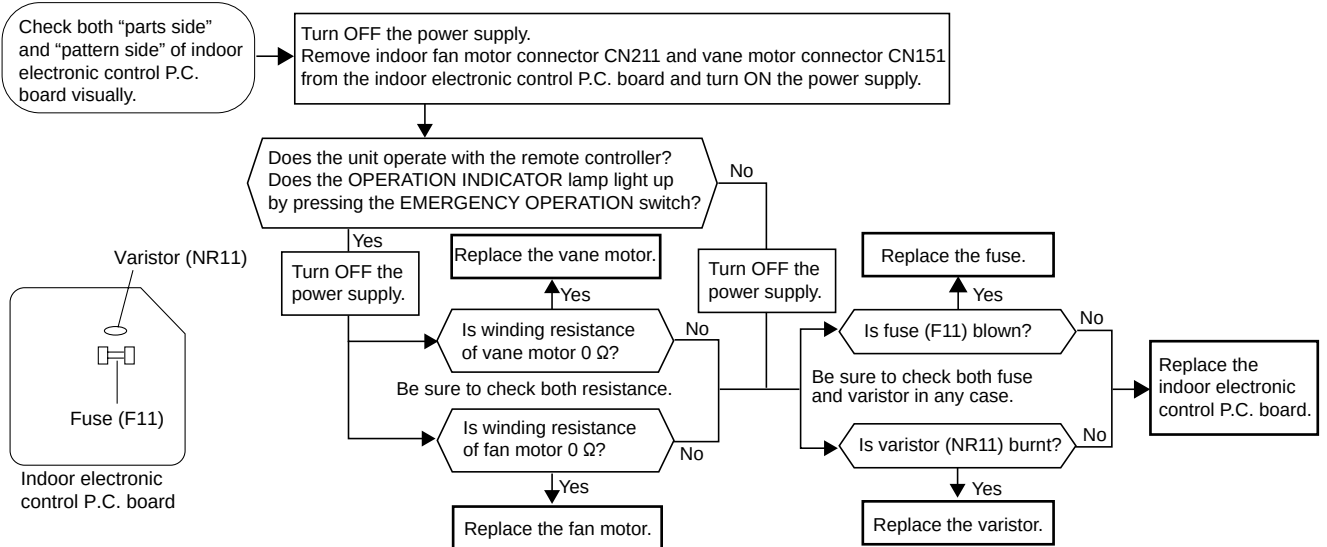
*** Check if the remote controller is exclusive for this air conditioner.**



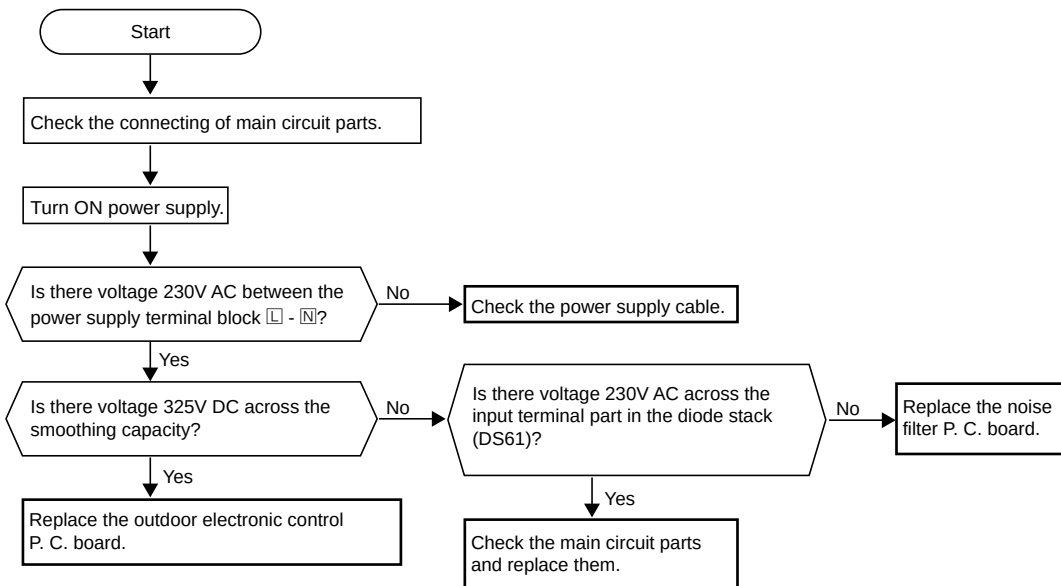
Unit doesn't operate with the remote controller.

Also, OPERATION INDICATOR lamp doesn't light up by EMERGENCY OPERATION switch ON.

T Check of indoor electronic control P.C. board

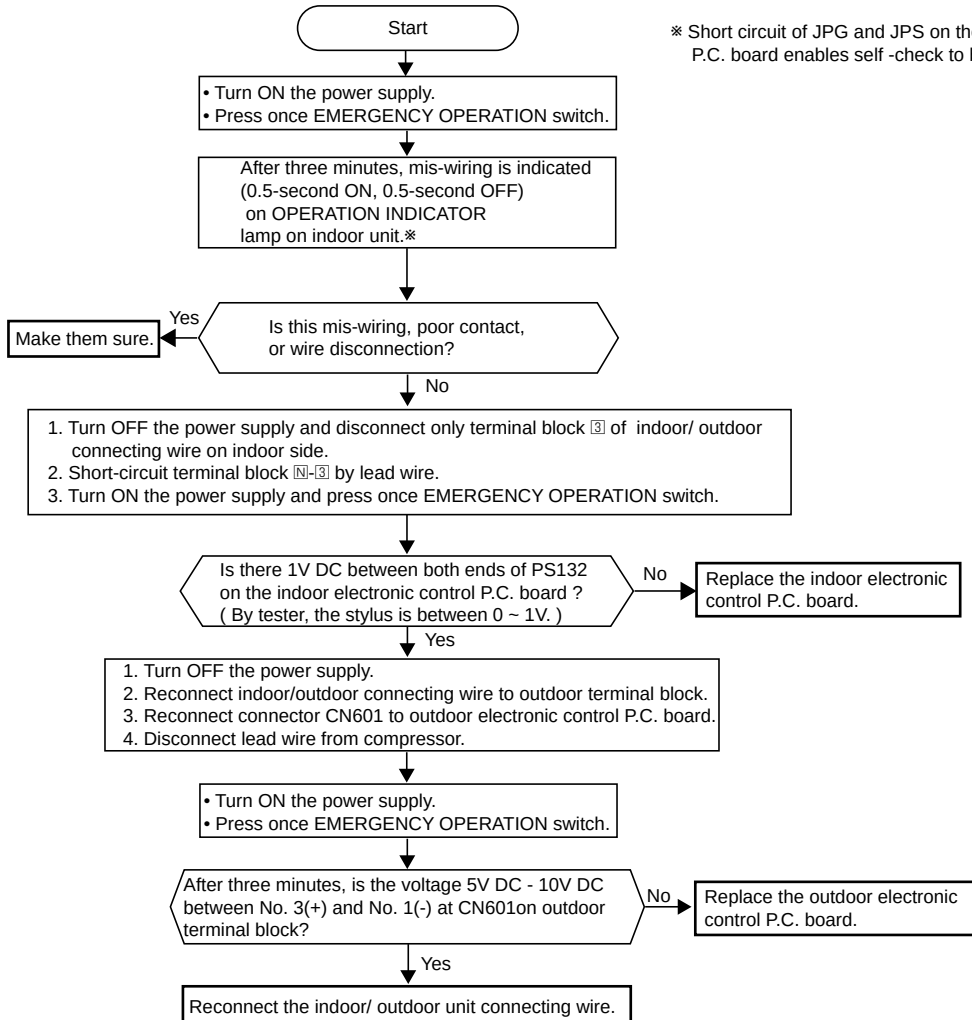


U Check of outdoor power supply



**When OPERATION INDICATOR lamp flashes on and off in every 0.5-second.
Outdoor unit doesn't operate.**

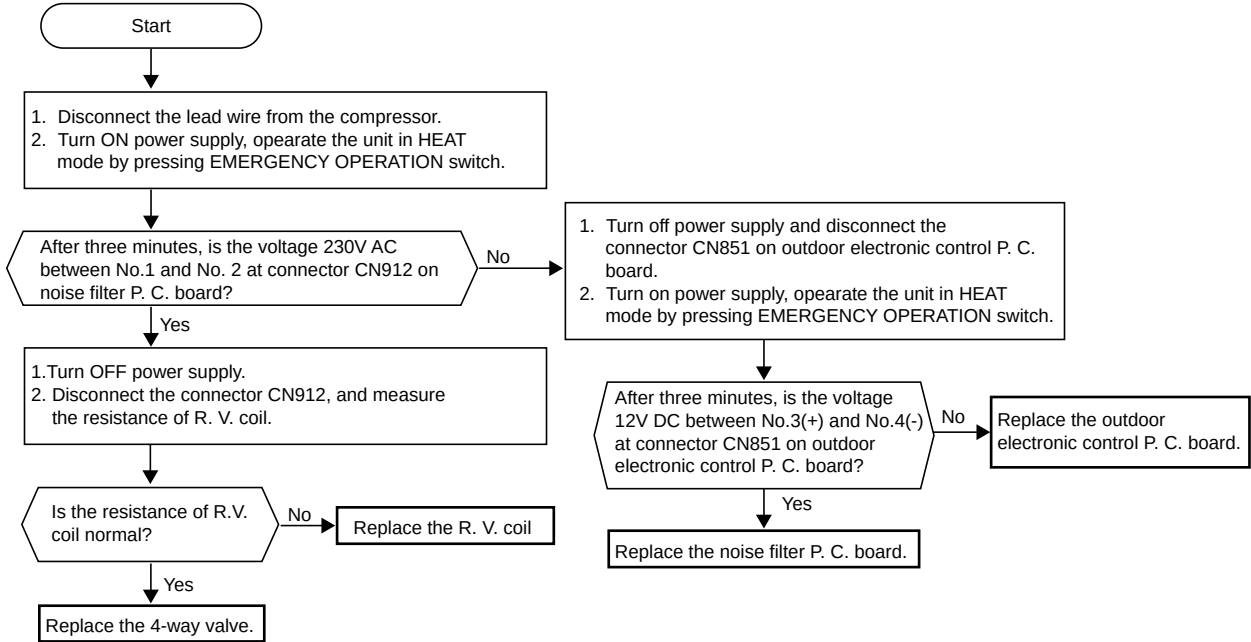
⑤ How to check mis-wiring



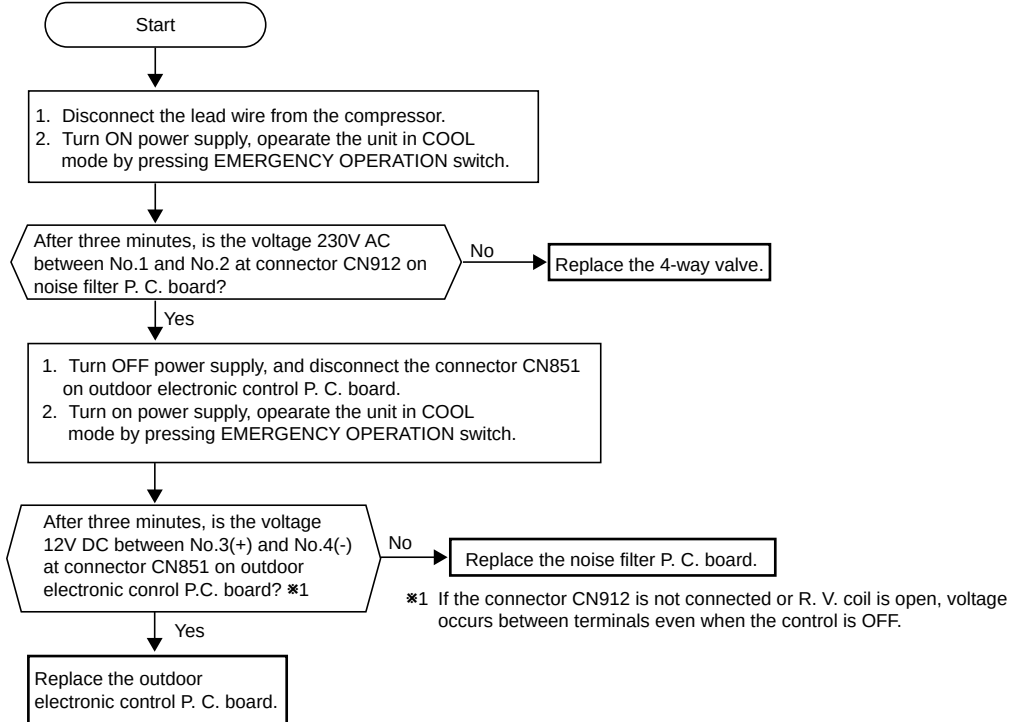
When OPERATION INDICATOR lamp flashes 10-time.

④ Check of R. V. coil

• When heating operation doesn't work.

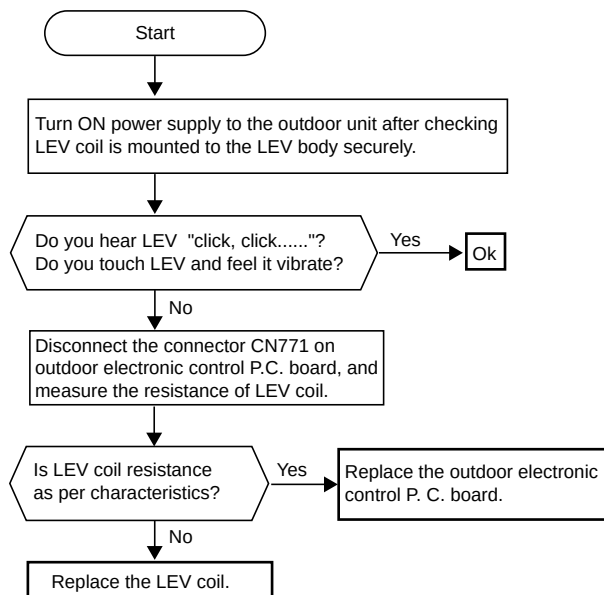


• When cooling operation doesn't work.



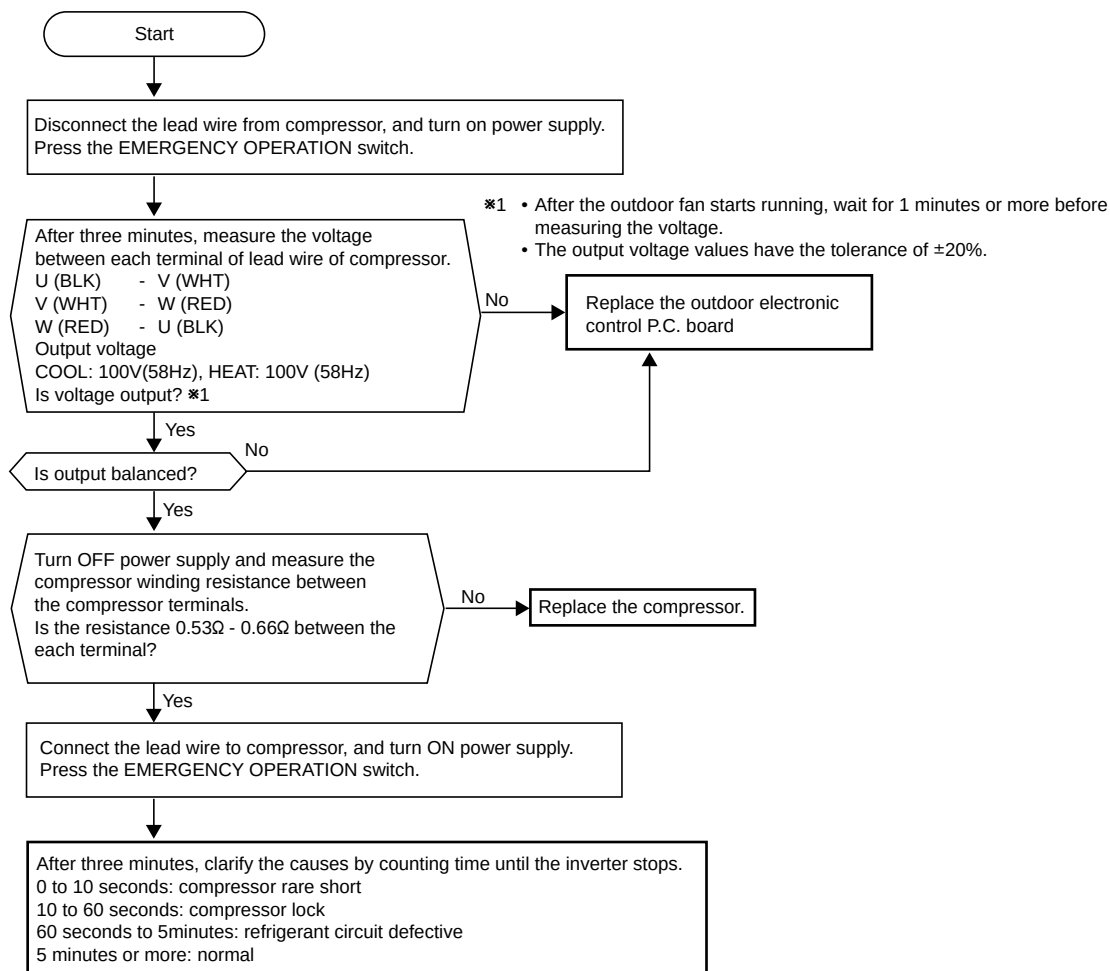
When OPERATION INDICATOR lamp flashes 10-time.

ⓧ Check of LEV



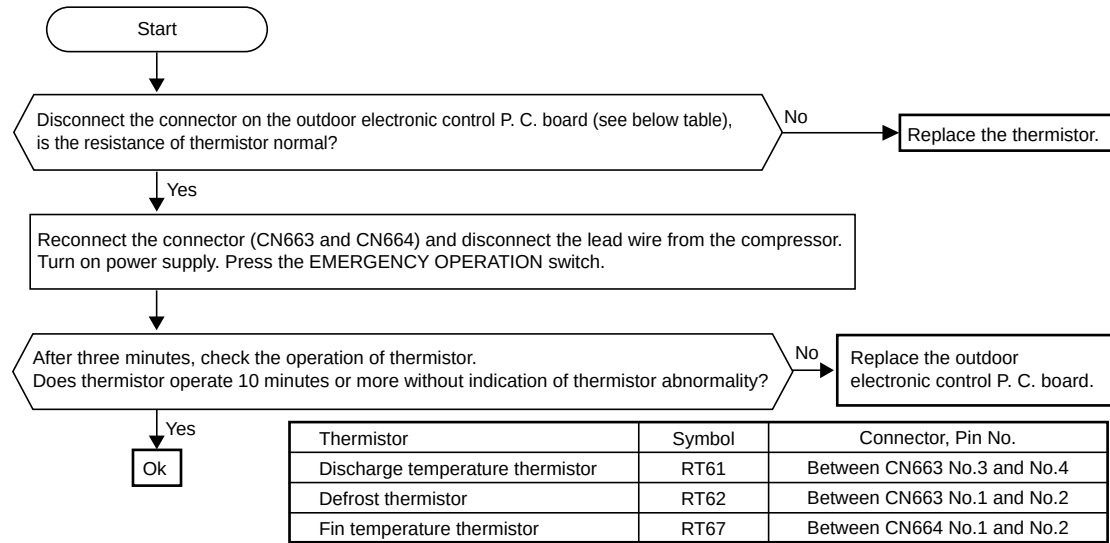
When OPERATION INDICATOR lamp flashes 5-time.

Ⓨ Check of inverter/ compressor



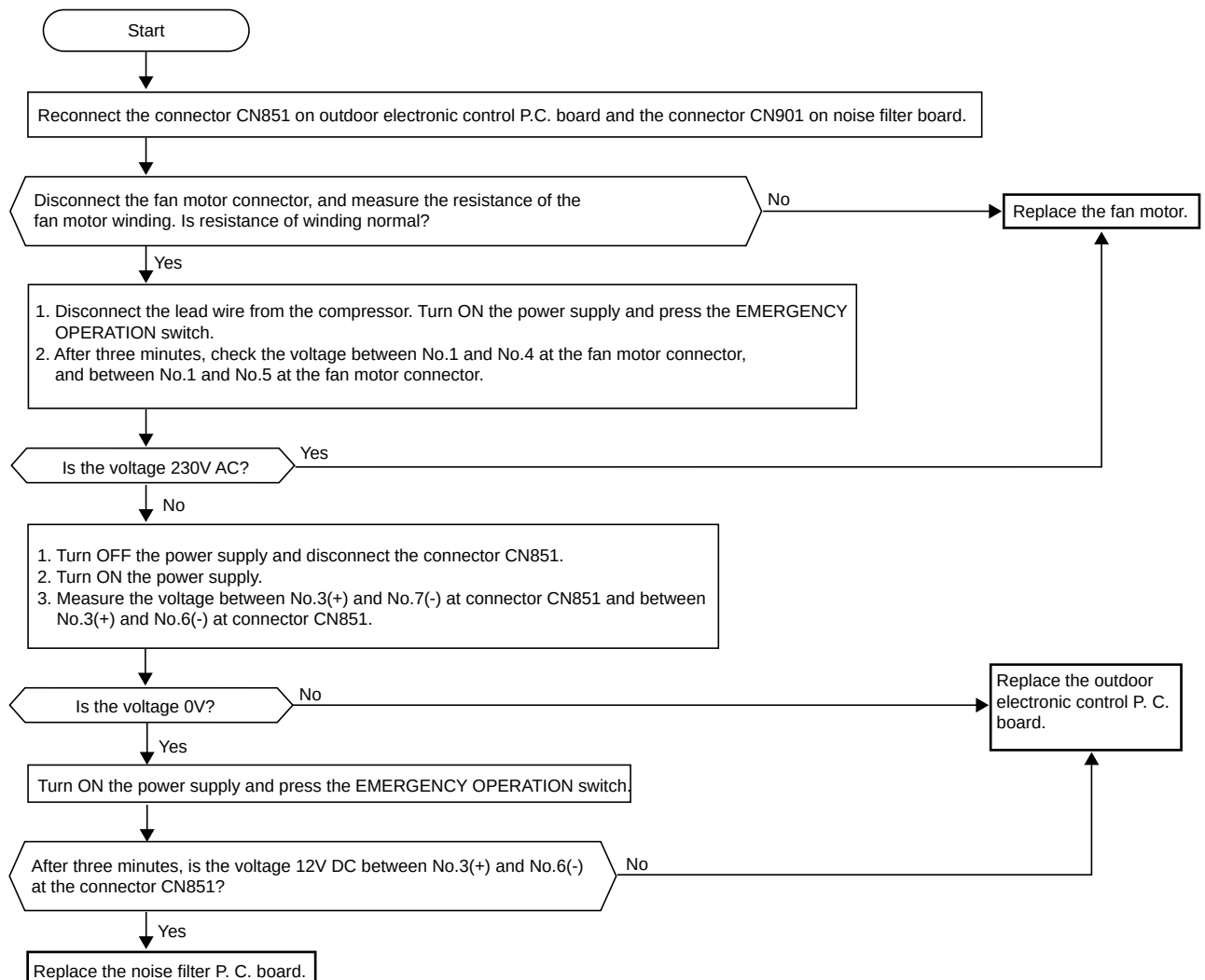
When OPERATION INDICATOR lamp flashes 6-time.

② Check of outdoor thermistor



When OPERATION INDICATOR lamp flashes 10-time.

AA Check of outdoor fan motor

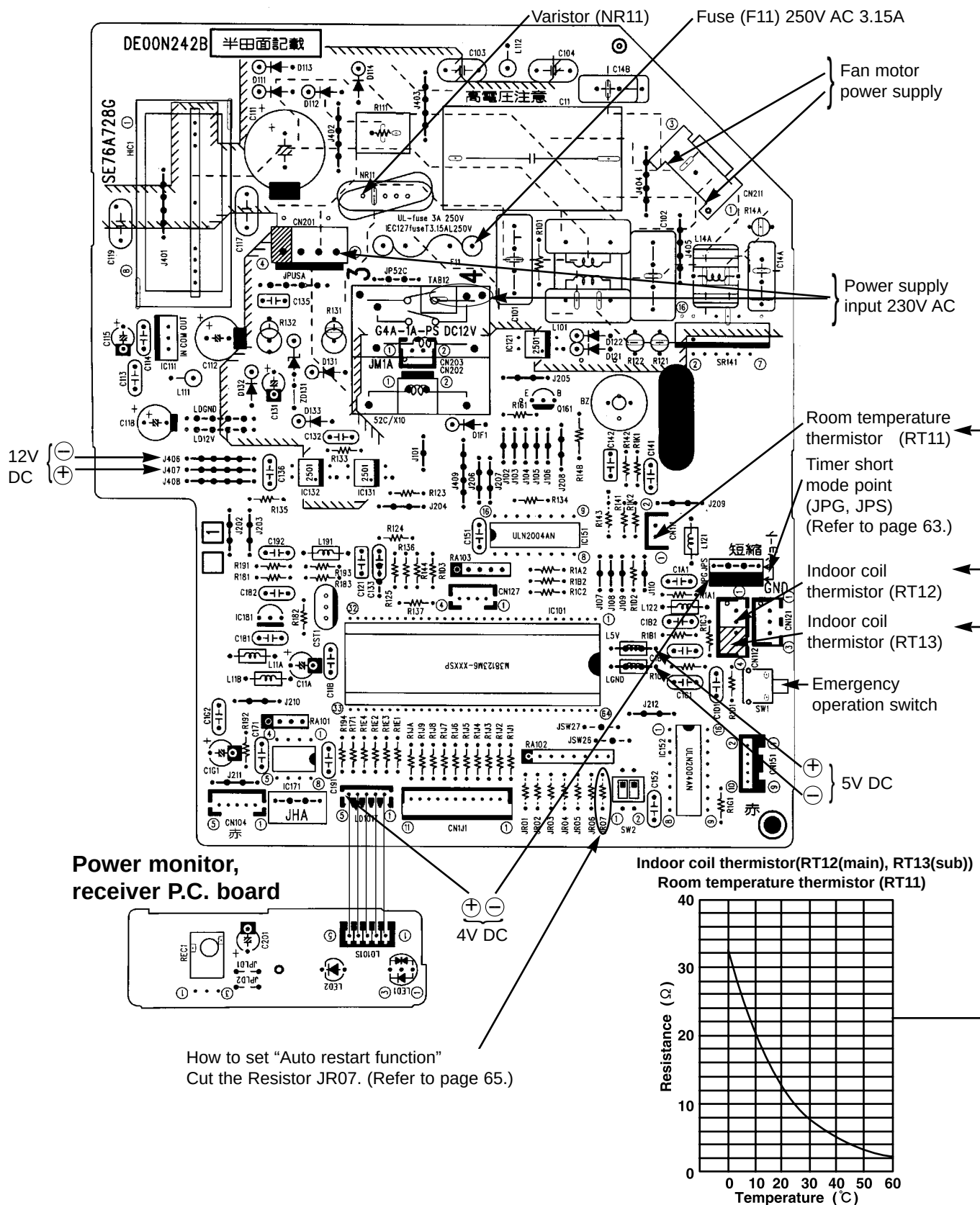


TEST POINT DIAGRAM AND VOLTAGE

MSZ-G09SV -E1 MSZ-G12SV -E1

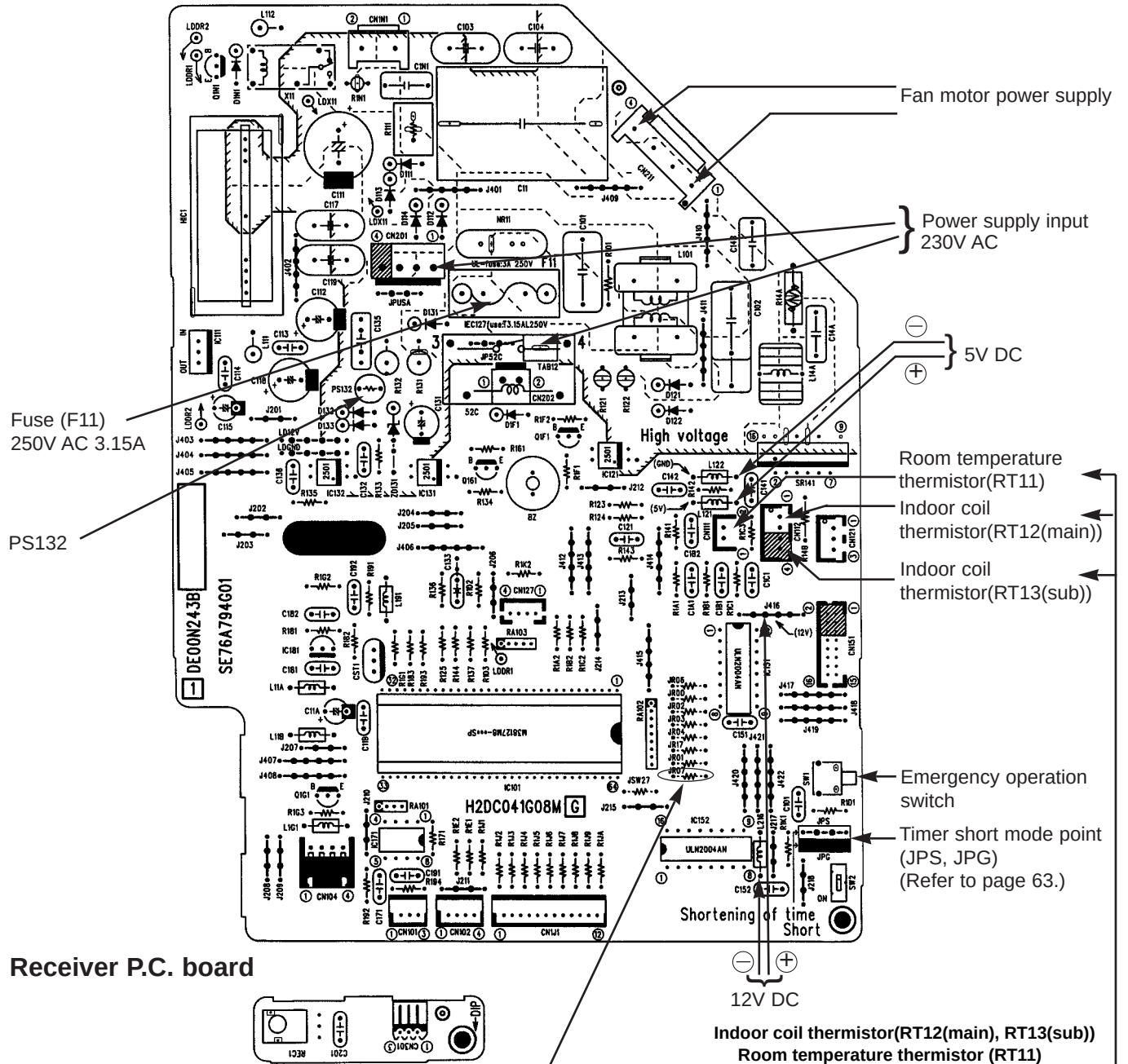
MSZ-G09SV -E2 MSZ-G12SV -E2

Indoor electronic control P.C. board

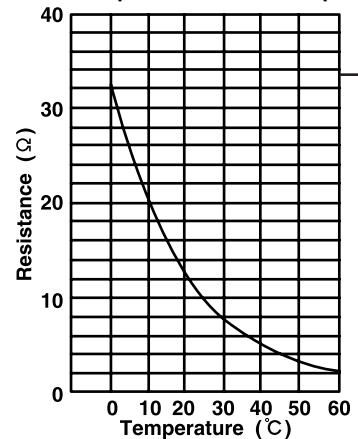


MSZ-G20SV - [E1]

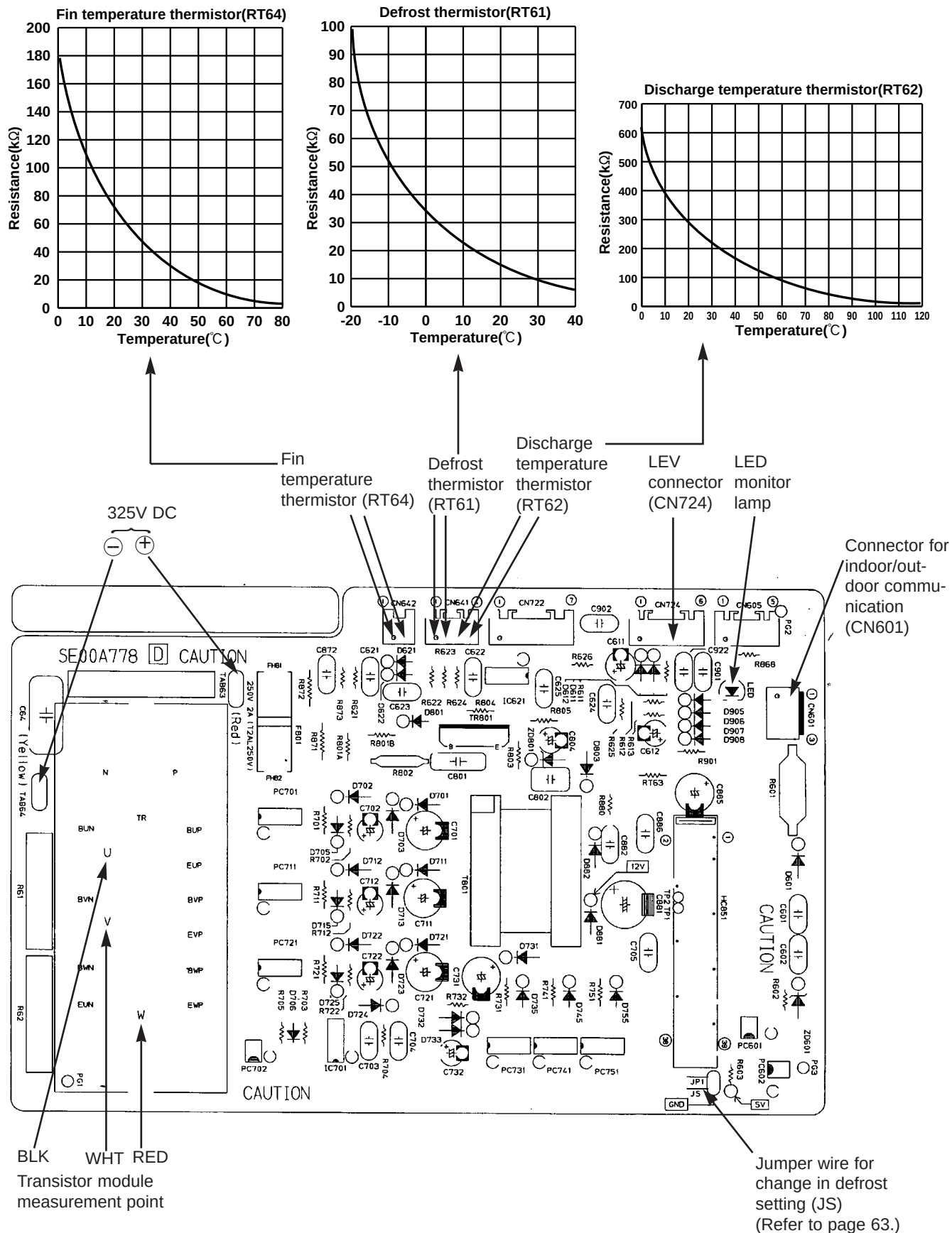
Indoor electronic control P.C. board



How to set "Auto restart function"
Cut the Resistor JR07. (Refer to page 65.)

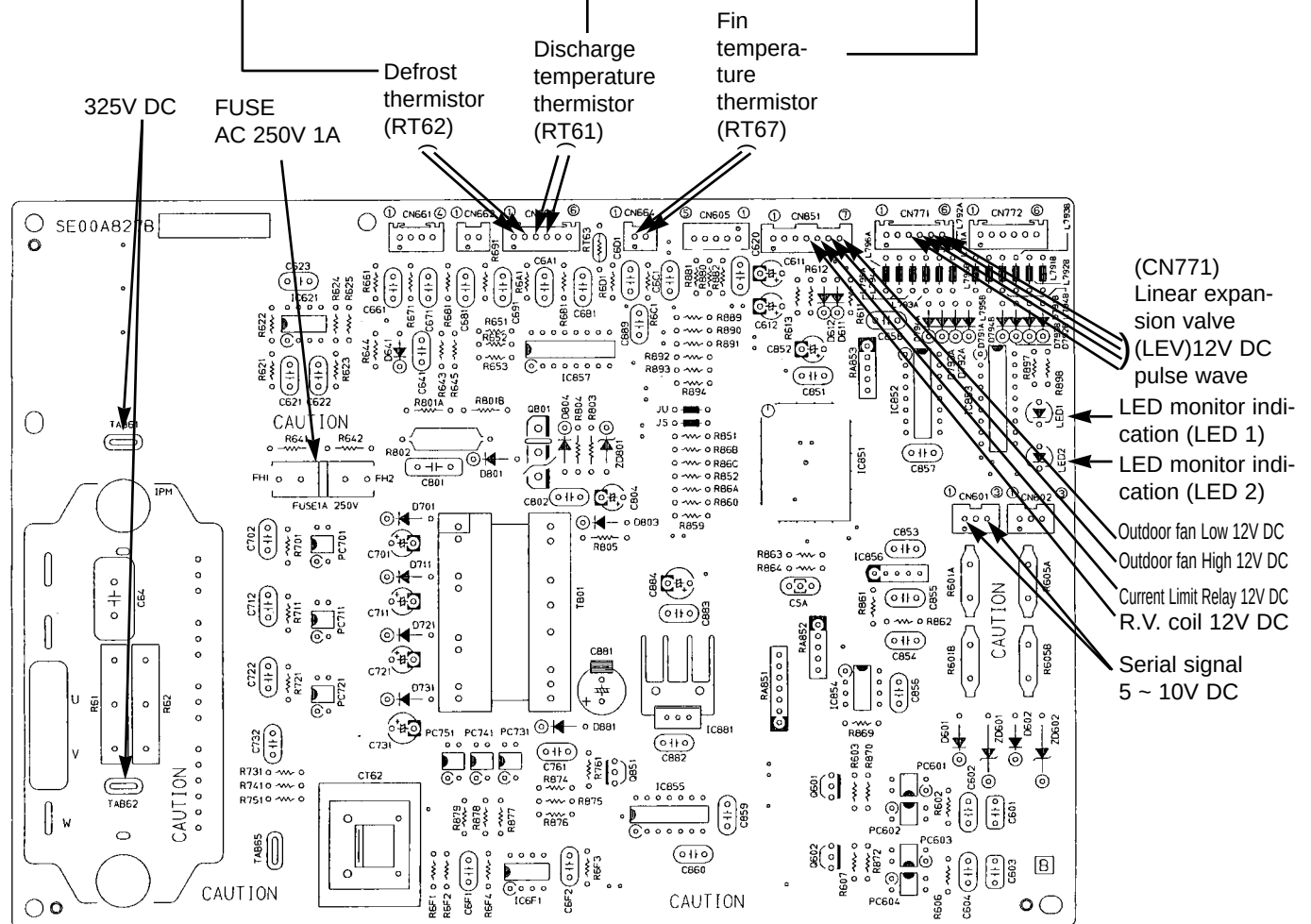
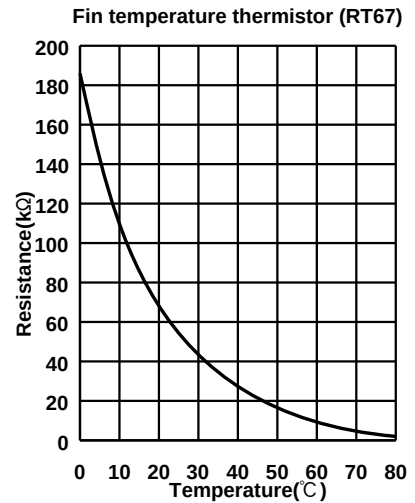
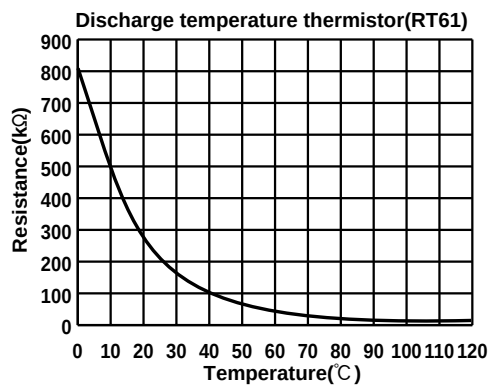
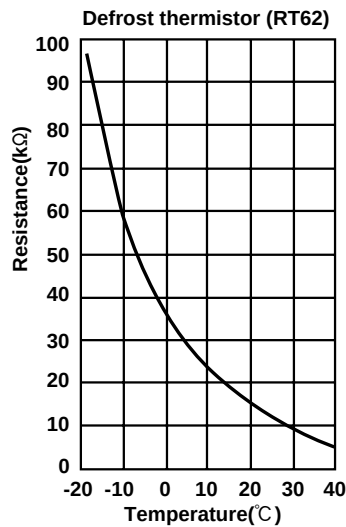


MUZ-G09SV -[E1] MUZ-G12SV -[E1]
MUZ-G09SV -[E2] MUZ-G12SV -[E2]
Outdoor electronic control P.C. board

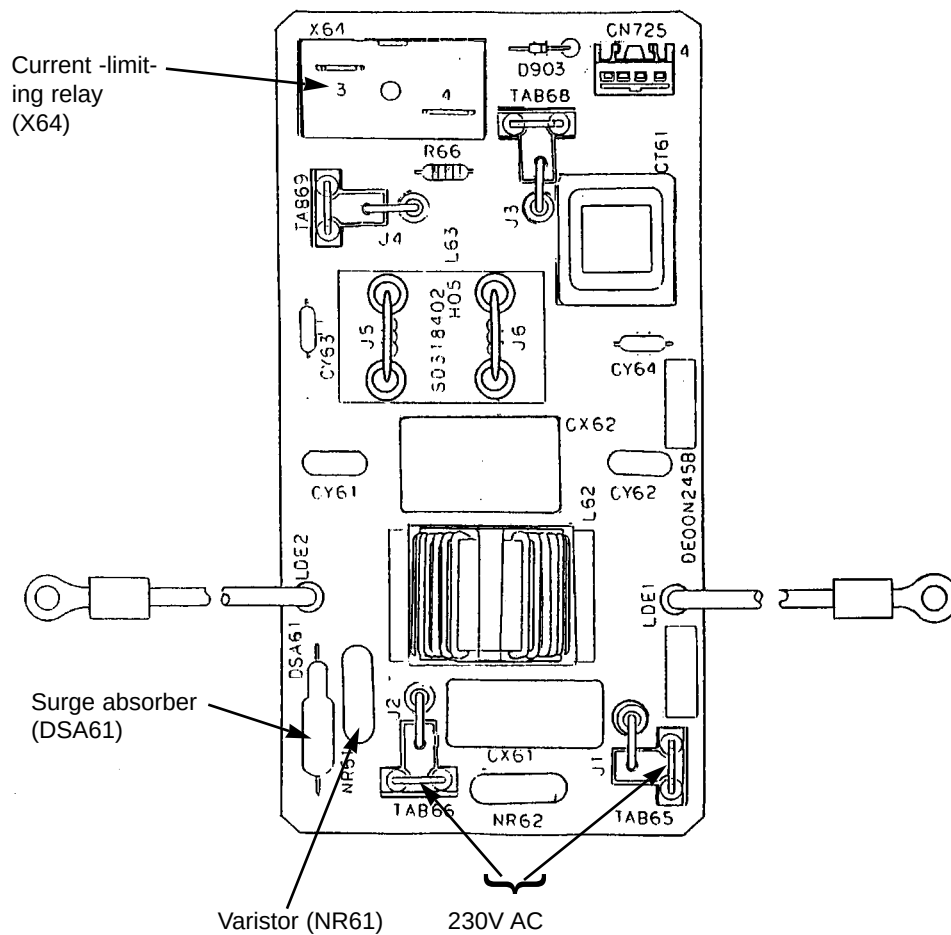


MUZ-G20SV -E1

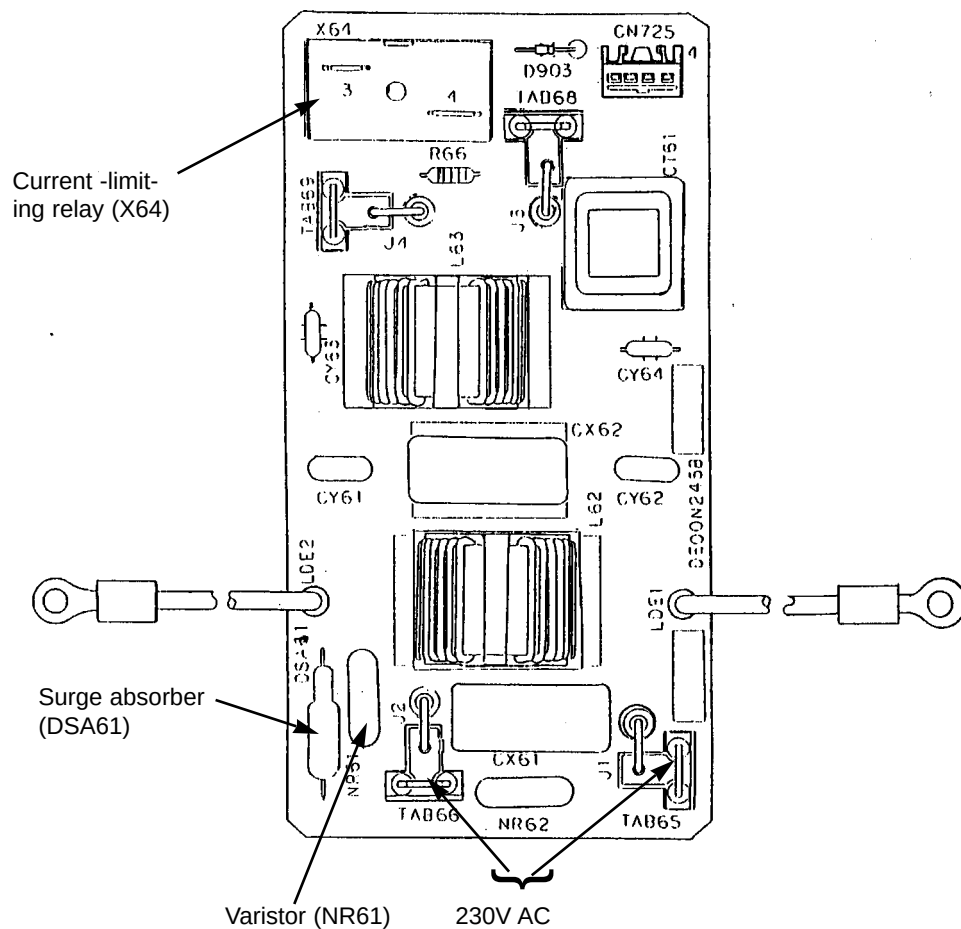
Outdoor electronic control P.C. board



MUZ-G09SV -[E1]
MUZ-G09SV -[E2]
Noise filter P.C. board

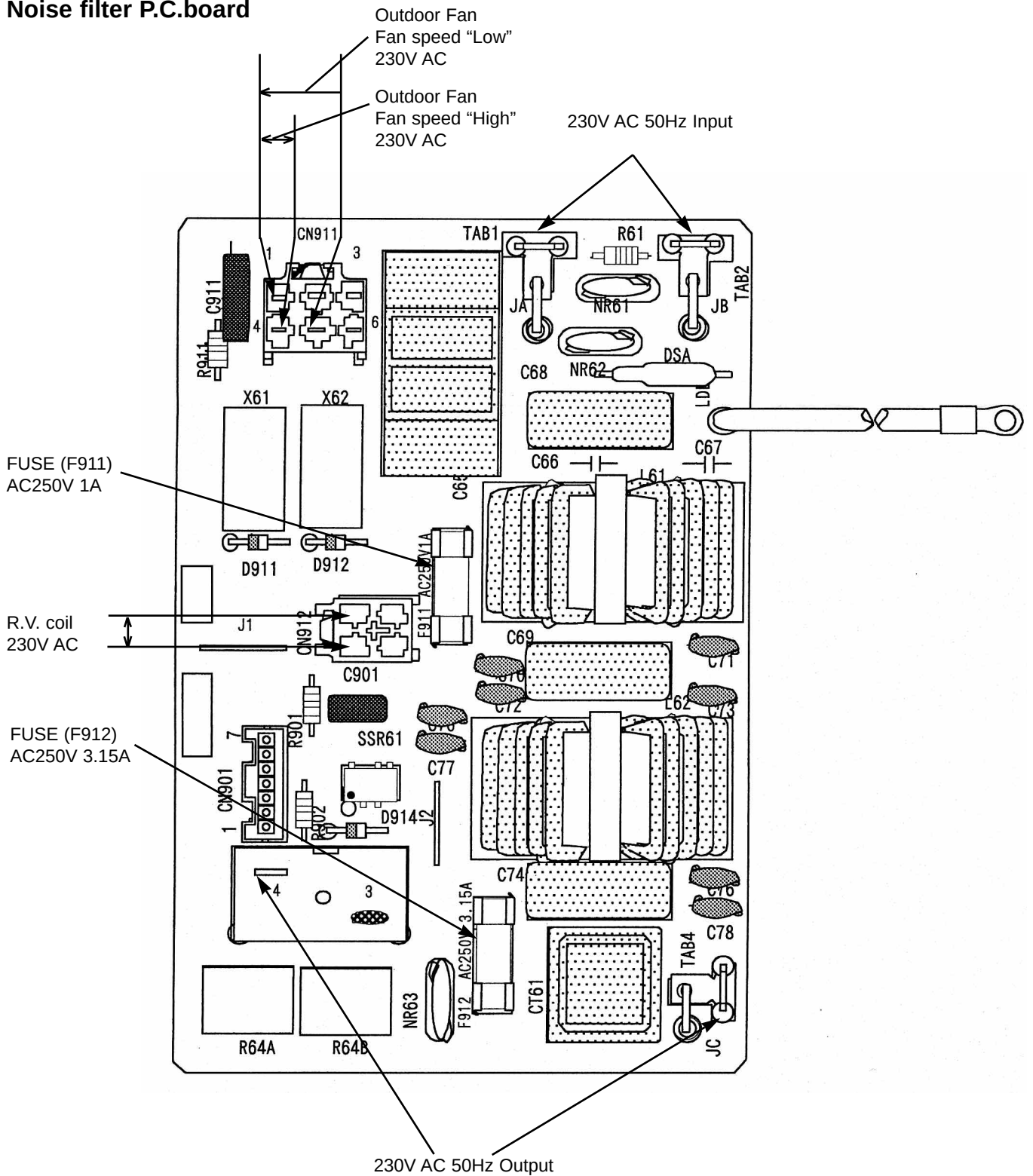


MUZ-G12SV -[E1]
MUZ-G12SV -[E2]
Noise filter P.C. board



MUZ-G20SV -[E1]

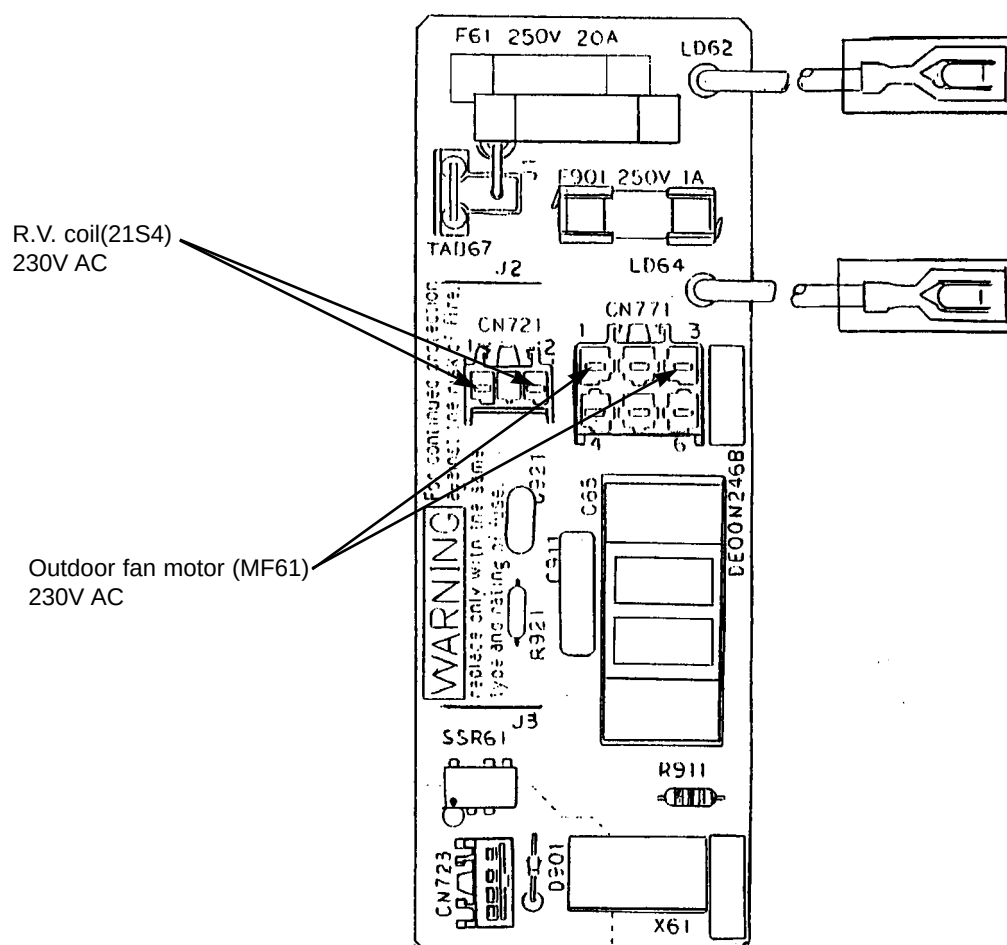
Noise filter P.C.board



MUZ-G09SV -[E1] MUZ-G12SV -[E1]

MUZ-G09SV -[E2] MUZ-G12SV -[E2]

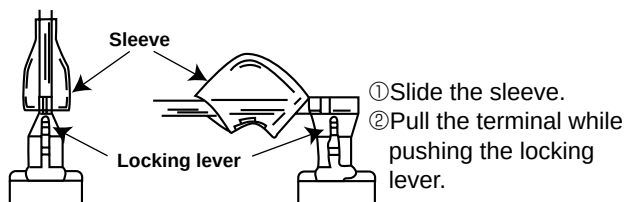
Relay P.C. board



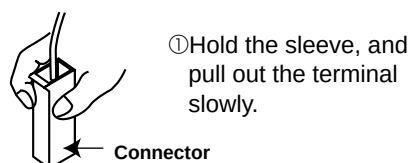
<"Terminal with lock mechanism" Detaching points>

In case of terminal with lock mechanism, detach the terminal as shown below.
There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.
The terminal with no lock mechanism can be removed by pulling it out.
Check the shape of the terminal and work.

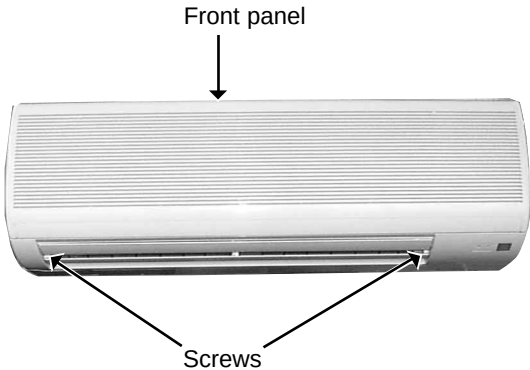
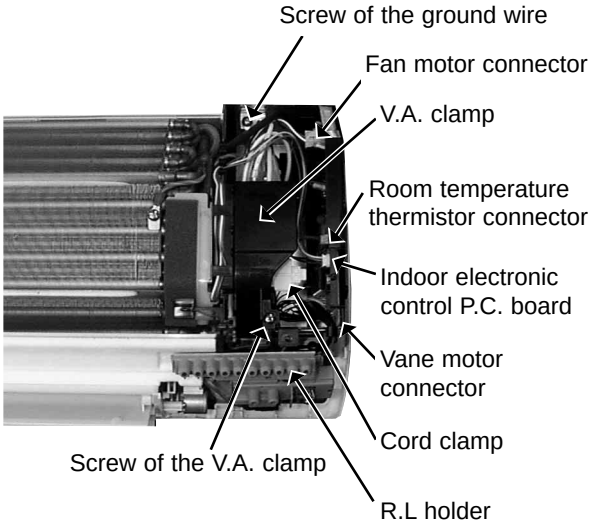
(1) Slide the sleeve and check if there is a locking lever or not.



(2) The terminal with this connector is a terminal with lock mechanism



12-1. MSZ-G09SV -[E1] MSZ-G12SV -[E1]
MSZ-G09SV -[E2] MSZ-G12SV -[E2]
INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screw caps of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top.	Photo 1 
2. Removing the electronic control P.C. board and the power monitor, receiver P.C. board (1) Remove the front panel. (Refer to 1) (2) Remove the screw of the electrical cover. Remove the electrical cover. (3) Remove the V.A. clamp. (4) Remove the cord clamp. (5) Remove the screw of the terminal block. (6) Remove the screw of the ground wire. (7) Disconnect all the connectors and all the lead wires on the electronic control P.C. board. (8) Remove the R.L holder. (9) Remove the electronic control P.C. board. (10) Open the R.L holder and remove the power monitor, receiver P.C. board.	Photo 2 

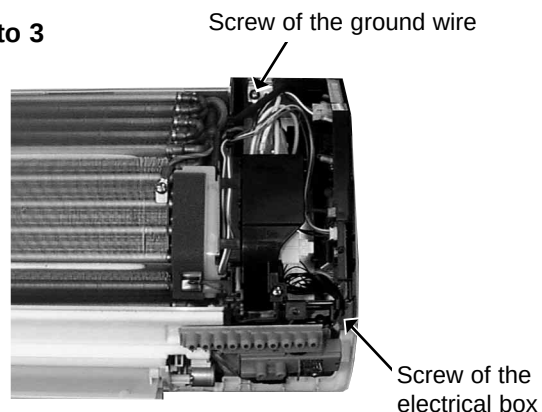
OPERATING PROCEDURE

3. Removing the electrical box

- (1) Remove the front panel. (Refer to 1)
- (2) Remove the electrical cover. (Refer to 2)
- (3) Disconnect the connector of the indoor coil thermistor.
- (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board.
- (5) Remove the screw of ground wire.
- (6) Remove the fan motor lead wire and indoor coil thermistor from the electrical box.
- (7) Remove the lead wire of vane motor from the bottom of electrical box.
- (8) Remove the screw fixing the electrical box, remove the electrical box.

PHOTOS

Photo 3



4. Removing the vane motor

- (1) Remove the front panel.
- (2) Remove the screws of the vane motor, disconnect the vane motor connectors from the electronic control P.C. board.
- (3) Disconnect the R.L. holder.
- (4) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.
- (5) Remove the vane motors.

Photo 5

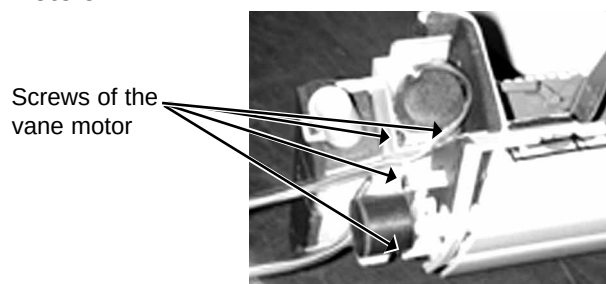
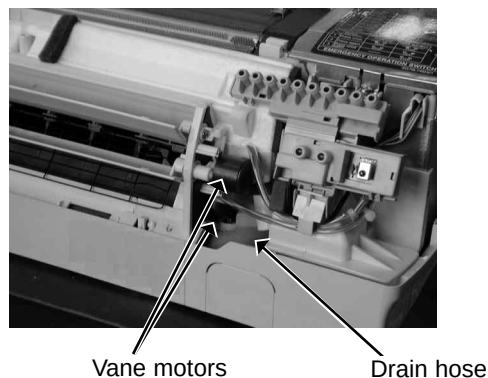


Photo 4



5. Removing the line flow fan and the indoor fan motor

- (1) Remove the front panel. (Refer to 1)
- (2) Remove the electrical box. (Refer to 3)
- (3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.
- (4) Remove the hexagon socket set screw from the line flow fan.
- (5) Remove the screws fixing the fan motor, remove the fan motor.
- (6) Remove the screws fixing the left side of the heat exchanger.
- (7) Lifting the left side of the heat exchanger.
- (8) Remove the line flow fan.

Photo 6

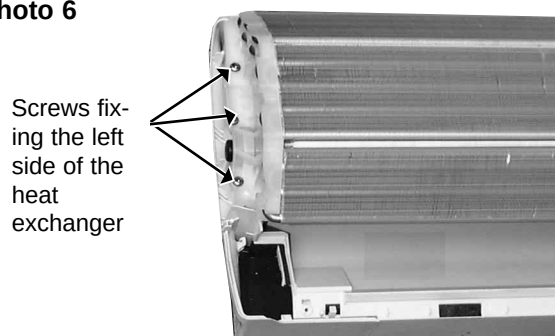
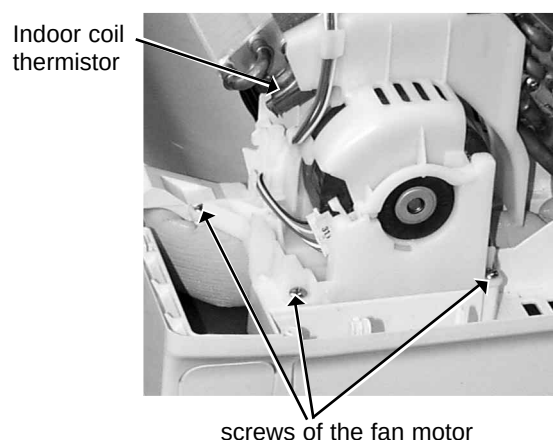
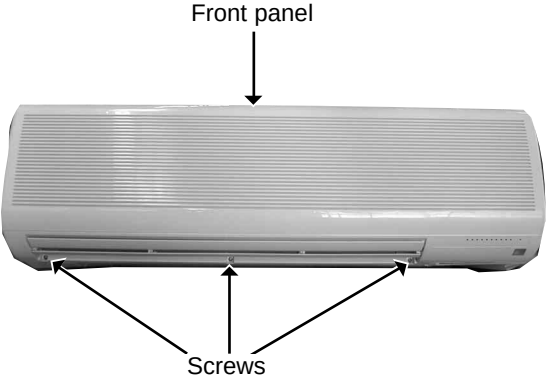
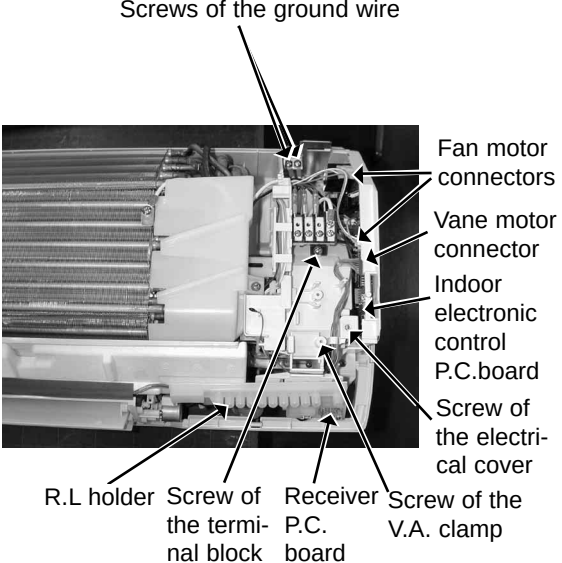


Photo 7



12-2. MSZ-G20SV -[E1] INDOOR UNIT

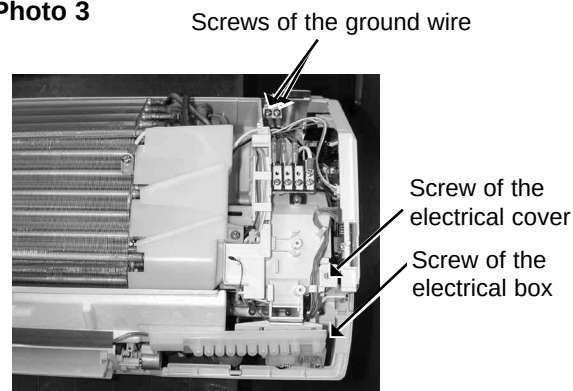
OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screw caps of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top.	Photo 1 
2. Removing the electronic control P.C. board, the receiver P.C. board and the display P.C. board (1) Remove the front panel. (Refer to 1) (2) Remove the screw of the electrical cover. Remove the electrical cover. (3) Remove the screw of the V.A. clamp. Remove the V.A. clamp. (4) Remove the screw of the terminal block. (5) Remove the screw of the ground wire. (6) Disconnect all the connectors and all the lead wires on the electronic control P.C. board. (7) Remove the R.L holder. (8) Remove the electronic control P.C. board. (9) Open the R.L holder, remove the receiver P.C. board and the display P.C. board.	Photo 2 

OPERATING PROCEDURE

3. Removing the electrical box

- (1) Remove the front panel. (Refer to 1)
- (2) Remove the electrical cover. (Refer to 2)
- (3) Disconnect the connector of the indoor coil thermistor.
- (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board.
- (5) Remove the screws of ground wire.
- (6) Remove the fan motor lead wire and indoor coil thermistor from the electrical box.
- (7) Remove the lead wire of vane motor from the bottom of electrical box.
- (8) Remove the screw fixing the electrical box, remove the electrical box.

Photo 3



4. Removing the vane motor

- (1) Remove the front panel. (Refer to 1)
- (2) Remove the electrical cover. (Refer to 2)
- (3) Remove the lead wire of vane motor. (Refer to 3)
- (4) Remove the R.L. holder.
- (5) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.
- (6) Remove the screws of the vane motor, disconnect the connector.
- (7) Remove the vane motor.

Photo 5 Screws of the vane motor

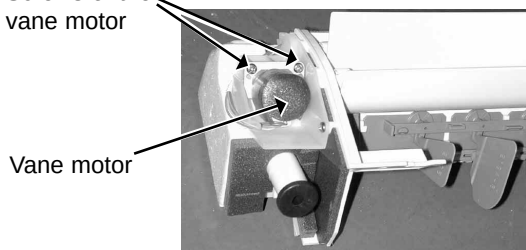
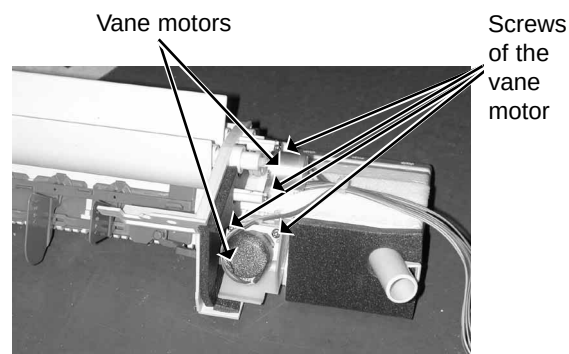


Photo 4



5. Removing the line flow fan and the indoor fan motor

- (1) Remove the front panel. (Refer to 1)
- (2) Remove the electrical box. (Refer to 3)
- (3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.
- (4) Remove the water cut.
- (5) Slide the hole cover, remove the hole cover.
- (6) Remove the hexagon socket set screw from the line flow fan.
- (7) Remove the screws fixing the fan motor and the fan motor. (Be careful not to drop the fan motor because it is heavy.)
- (8) Remove the screws fixing the left side of the heat exchanger.
- (9) Lifting the left side of the heat exchanger.
- (10) Remove the line flow fan.

Photo 8

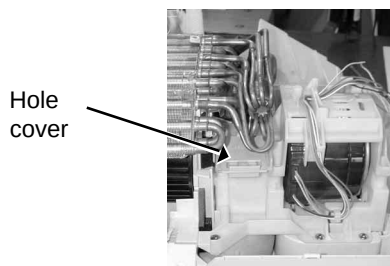


Photo 6

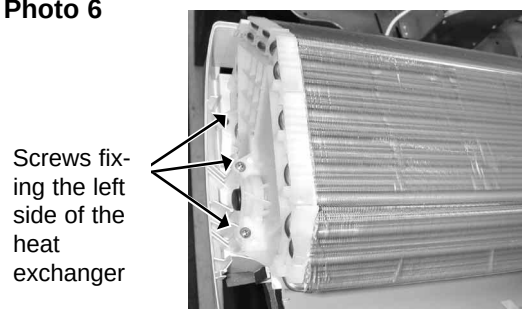
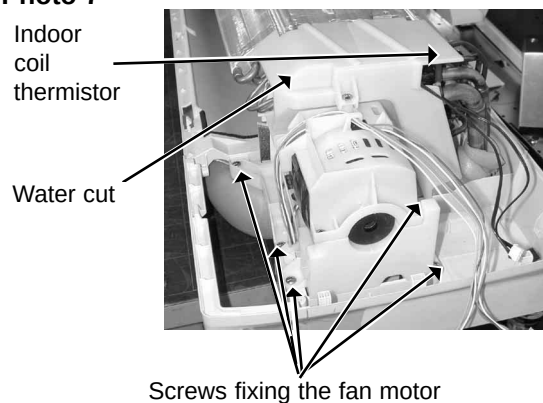
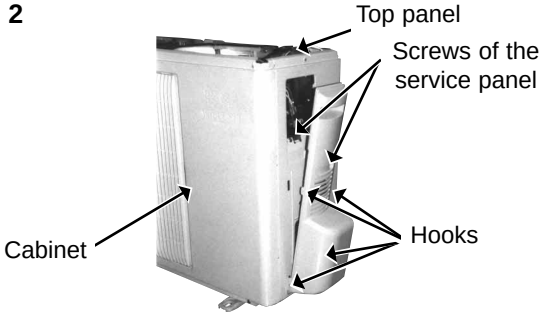
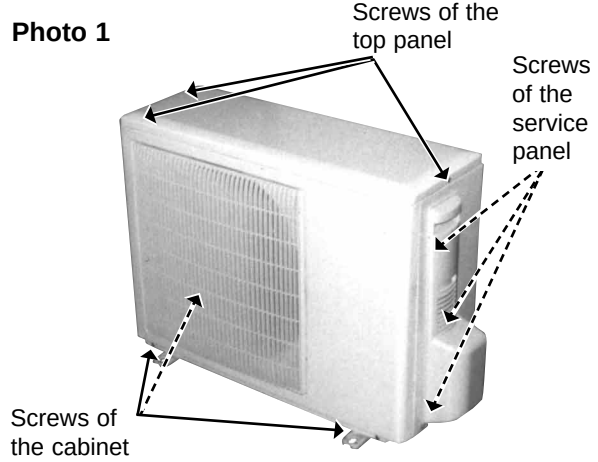
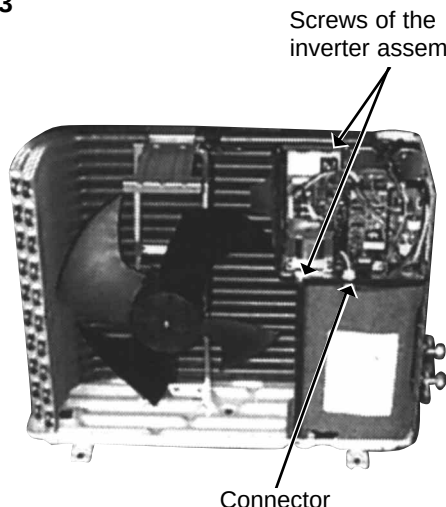
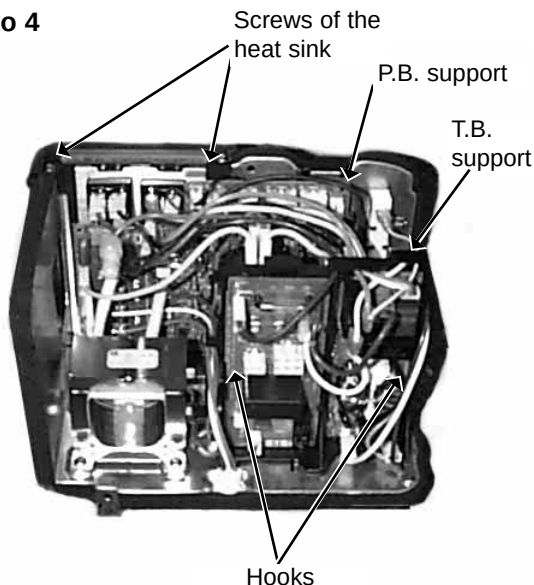


Photo 7



12-3. MUZ-G09SV -[E1] MUZ-G12SV -[E1]
MUZ-G09SV -[E2] MUZ-G12SV -[E2]
OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws fixing the service panel. (2) Pull down the service panel and remove it from the cabinet. (3) Remove the screws fixing the cabinet and top panel. (4) Remove the top panel and cabinet. Photo 2 	Photo 1 
2. Removing the inverter assembly (1) Remove the service panel, top panel and cabinet. (Refer to 1) (2) Disconnect the connectors (CN641, CN642, CN601 and CN724) on the electronic control P.C. board. (3) Remove the connectors (CN771 and CN721) on the relay P.C. board. (4) Remove the screws fixing the inverter assembly. (5) Remove the compressor connector. (6) Remove the inverter assembly. 3. Removing the noise filter P.C. board (1) Remove the service panel, top panel and the cabinet. (Refer to 1) (2) Remove all the connectors and the terminals on the noise filter P.C. board. (3) Remove the screw of ground wire on the relay panel. (4) Remove the hook of T.B. support. Then, remove the noise filter P.C. board. 4. Removing the relay P.C. board (1) Remove the service panel, top panel and the cabinet. (Refer to 1) (2) Remove all the connectors and the terminals on the relay P.C. board. (3) Remove the hook of T.B. support. Then, remove the relay P.C. board.	Photo 3 
5. Removing the electronic control P.C. board (1) Remove the service panel, top panel and the cabinet. (Refer to 1) (2) Remove the inverter assembly. (3) Remove the terminal of diode stack. (4) Remove all the connectors and the terminals on the electronic control P.C. board. (5) Remove the screws fixing the P.B. support. (6) Pull up the heat sink and remove the electronic control P.C. board from the relay panel. (7) Remove the screws fixing the heat sink and the transistor module. (8) Remove the electronic control P.C. board from the heat sink.	Photo 4 



OPERATING PROCEDURE

- 6. Removing the outdoor fan motor**
- (1) Remove the cabinet. (Refer to 1.)
 - (2) Remove the propeller fan nut.
 - (3) Remove the propeller fan.
 - (4) Remove lead clamps and fan motor lead wires.
 - (5) Remove screws fixing the fan motor.
 - (6) Remove the outdoor fan motor.

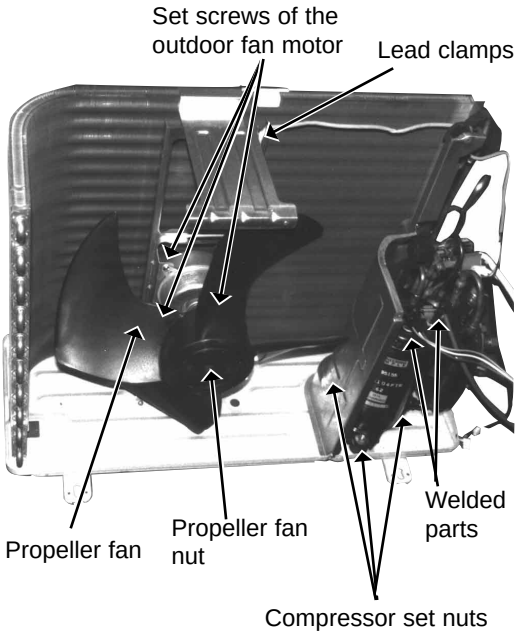
- 7. Removing the compressor**
- (1) Remove the service panel, top panel and the cabinet. (Refer to 1)
 - (2) Remove the soundproof felt.
 - (3) Remove the terminal cover on the compressor.
 - (4) Remove the electrical assembly. (Refer to 2)
 - (5) Recover gas from the refrigerant circuit.
 - (6) Disconnect the welded part of the discharge pipe.
 - (7) Disconnect the welded part of the suction pipe.
 - (8) Remove nuts fixing the compressor.
 - (9) Remove the compressor.

NOTE

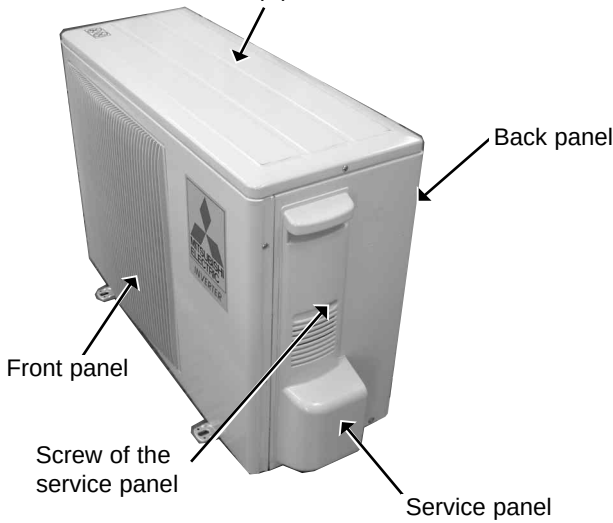
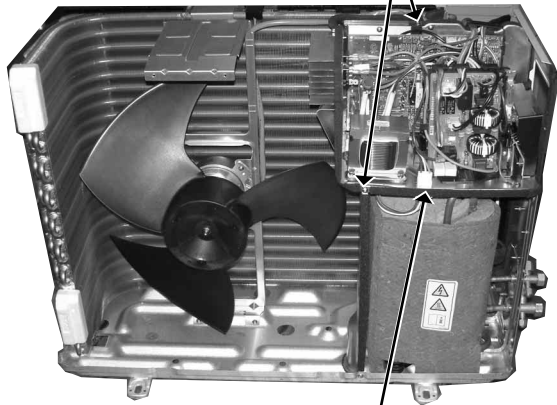
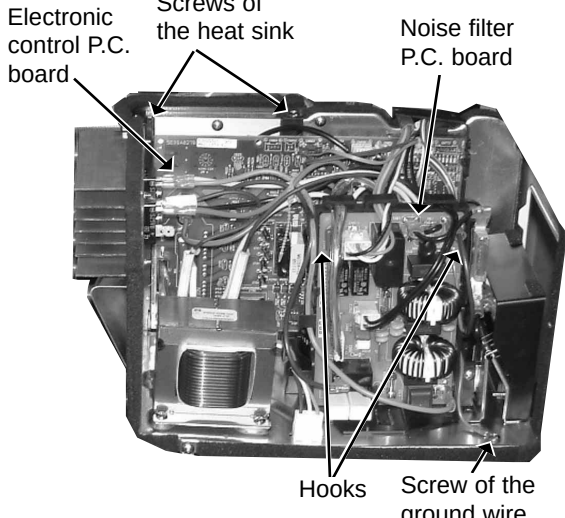
- Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm² (0MPa).
- Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.

PHOTOS

Photo 5



12-4. MUZ-G20SV -[E1] OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the back panel (1) Remove the screws fixing the top panel and the top panel. (Photo 1) (2) Remove the screw fixing the service panel, pull down the service panel and remove it. (Photo 2) (3) Remove the screws fixing the front panel and the front panel. (4) Remove the inside and outside connection electric wire. (5) Remove the screws fixing back panel and back panel. Photo 2 	Photo 1 
2. Removing the inverter assembly (1) Remove the top panel, front panel and service panel. (Refer to 1) (2) Remove the inside and outside connection electric wire, remove the back panel. (3) Disconnect the outdoor fan motor connector (CN911), R.V. coil (CN912) on the noise filter P.C. board, the connector of discharge / defrost temperature thermistor (CN663) and LEV (CN771) on the electronic control P.C. board. (4) Remove the compressor connector. (Photo 3) (5) Remove the screws fixing the relay panel, and remove the inverter assembly. (Photo 3)	Photo 3 
3. Removing the electronic control P.C. board (1) Remove the top panel, front panel and service panel. (Refer to 1) (2) Remove all the connectors and the lead wire on the electronic control P.C board. (3) Remove the compressor connector. (4) Remove the screws fixing the heat sink, and pull up the electronic control P.C. board. (5) Remove the electronic control P.C. board.	Photo 4 
4. Removing the noise filter (1) Remove the top panel, front panel and service panel. (Refer to 1) (2) Remove all the connectors, the lead wire and ground wire on the relay panel. (3) Remove the hooks, then move the noise filter P.C. board.	

OPERATING PROCEDURE

5. Removing the R.V. coil

- (1) Remove the top panel, front panel and service panel. (Refer to 1)
- (2) Remove the inside and outside connection electric wire and the back panel.
- (3) Remove R.V. coil and disconnect the connector CN912 on the noise filter P.C. board.

6. Defrost, Discharge temperature thermistor

- (1) Remove the top panel, front panel and the service panel.(Refer to 1)
- (2) Remove the inside and outside connection electric wire and the back panel.
- (3) Remove the connector CN663 on the electronic control P.C. board.
- (4) Remove the defrost thermistor and the discharge temperature thermistor on the compressor. (Photo 5)

7. Fin temperature thermistor

- (1) Remove the top panel, front panel and service panel.(Refer to 1)
- (2) Remove the inside and outside connection electric wire and the back panel.
- (3) Remove all the connectors, the lead wire and the ground wire on the electronic control P.C. board.
- (4) Remove the compressor connector. (Photo 3)
- (5) Remove the screws fixing the heat sink, and pull up the electronic control P.C. board. (Photo 4)
- (6) Remove the screws fixing the transistor module.
- (7) Remove the screws the fin temperature thermistor and the fin temperature thermistor. (Photo 6)

8. Removing the outdoor fan motor

- (1) Remove the top panel and the front panel.
- (2) Remove the fan motor connector (CN911) on the noise filter P.C. board.
- (3) Remove the propeller fan.
- (4) Remove the screws fixing the fan motor and the fan motor.

PHOTOS

Photo 5

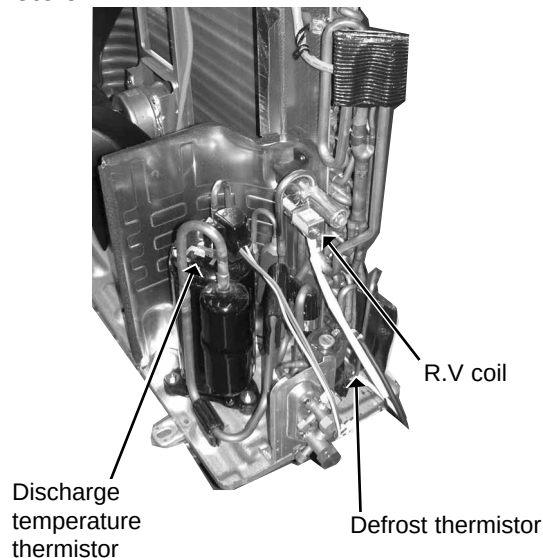


Photo 6

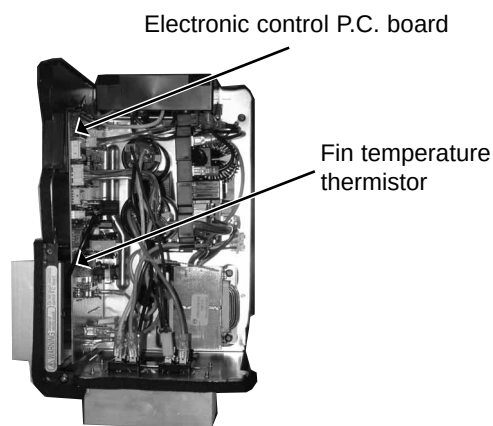
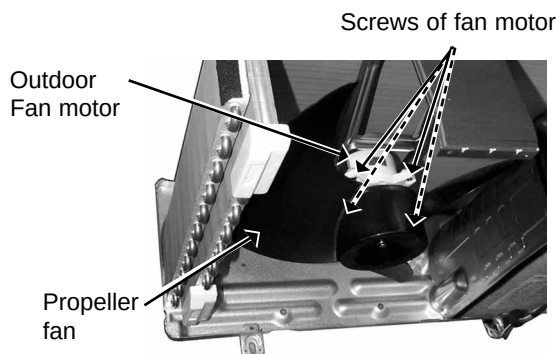
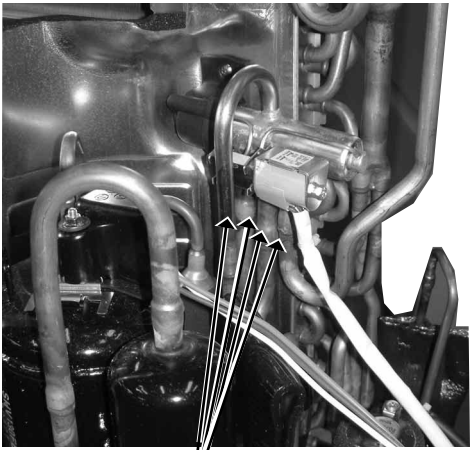


Photo 7



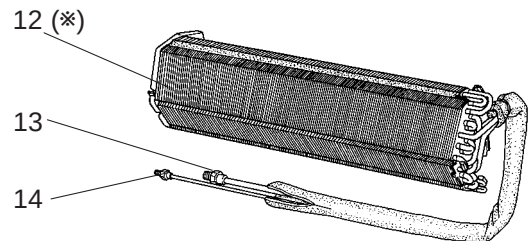
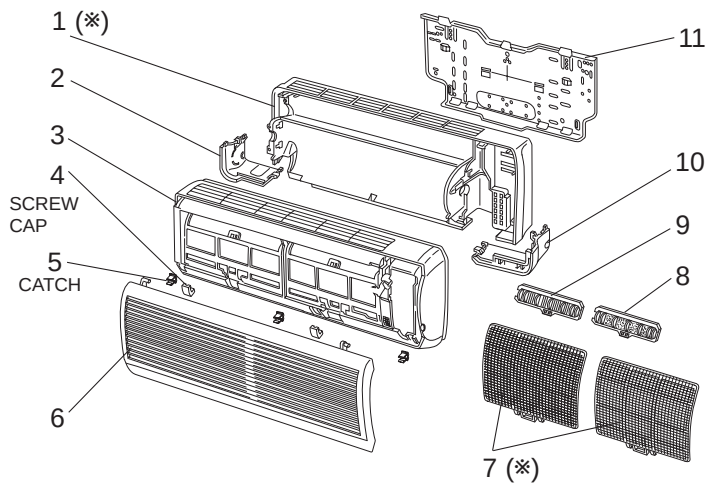


OPERATING PROCEDURE	PHOTOS
9. Remove the compressor and 4-way valve (1) Remove the top panel, front panel and service panel. (2) Remove the inside and outside connection electric wire and remove the back panel. (3) Remove the inverter assembly. (4) Recover gas from the refrigerant circuit. (5) Detach the brazed joints of the suction and the discharge pipe connected with compressor. (6) Remove the compressor nuts and remove the compressor. (7) Detach the welded parts of 4-way valve and pipe. (Photo 8) NOTE ● Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm² (0MPa). ● Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.	Photo 8  Welded parts

MSZ-G09SV -**E1** (WH) MSZ-G12SV -**E1** (WH)MSZ-G09SV -**E2** (WH) MSZ-G12SV -**E2** (WH)

13-1. INDOOR UNIT STRUCTURAL PARTS

13-2. INDOOR UNIT HEAT EXCHANGER



(*) These figures show about MSZ-G12SV.

13-1. INDOOR UNIT STRUCTURAL PARTS

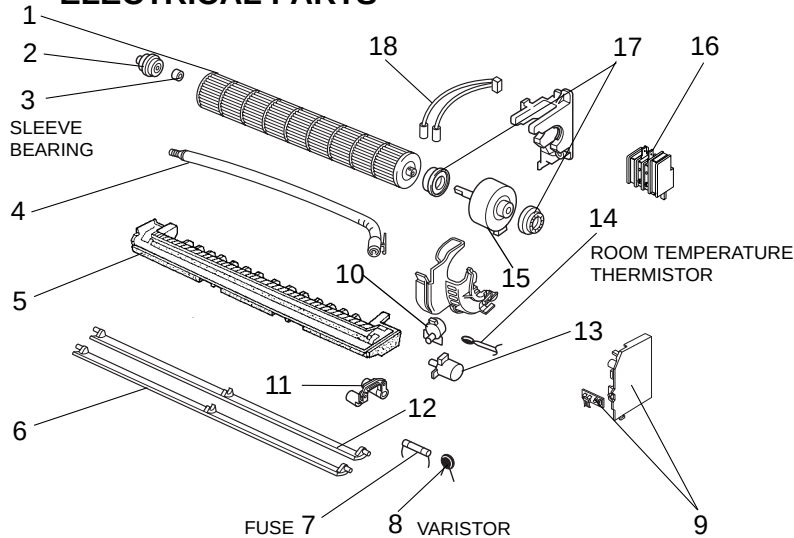
No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MSZ-G09SV-		MSZ-G12SV-		
				E1(WH)	E2(WH)	E1(WH)	E2(WH)	
1	E02 409 234	BOX (WH)		1	1			
	E02 411 234	BOX (WH)				1	1	
2	E02 409 976	CORNER BOX LEFT (WH)		1	1	1	1	
3	E02 424 000	FRONT PANEL ASSEMBLY (WH)		1	1	1	1	Including No.4,5,6
4	E02 409 067	SCREW CAP (WH)		2	2	2	2	2PCS/SET
5	E02 408 142	CATCH		3	3	3	3	3PCS/SET
6	E02 424 010	GRILLE (WH)		1	1	1	1	
7	E02 408 100	AIR FILTER		2	2			
	E02 410 100	AIR FILTER				2	2	
8	—	DEODORIZING FILTER		1	1	1	1	See page 114. (MAC-1800DF)
9	—	AIR CLEANING FILTER		1	1	1	1	See page 114. (MAC-1300FT)
10	E02 409 975	CORNER BOX RIGHT (WH)		1	1	1	1	
11	E02 408 970	INSTALLATION PLATE		1	1	1	1	

13-2. INDOOR UNIT HEAT EXCHANGER

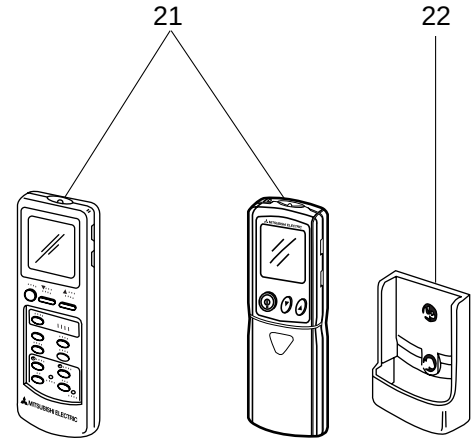
12	E02 518 620	INDOOR HEAT EXCHANGER		1	1			
	E02 448 620	INDOOR HEAT EXCHANGER				1	1	
13	E02 151 666	UNION (GAS)		1	1			φ9.52
	E02 155 666	UNION (GAS)				1	1	φ12.7
14	E02 151 667	UNION (LIQUID)		1	1	1	1	φ6.35

MSZ-G09SV -**E1** (WH) MSZ-G12SV -**E1** (WH)
MSZ-G09SV -**E2** (WH) MSZ-G12SV -**E2** (WH)

13-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS



13-4. ACCESSORY AND REMOTE CONTROLLER



MSZ-G09SV-**E1**
MSZ-G12SV-**E1**

MSZ-G09SV-**E2**
MSZ-G12SV-**E2**

13-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS

Part numbers that are circled are not shown in the illustration.

No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MSZ-G09SV-		MSZ-G12SV-		
				E1 (WH)	E2 (WH)	E1 (WH)	E2 (WH)	
1	E02 408 302	LINE FLOW FAN		1	1	1	1	
2	E02 408 509	BEARING MOUNT		1	1	1	1	
3	E02 001 504	SLEEVE BEARING		1	1	1	1	
4	E02 408 702	DRAIN HOSE		1	1	1	1	
5	E02 448 235	NOZZLE ASSEMBLY(WH)		1	1	1	1	
6	E02 409 041	VANE LOWER (WH)		1	1	1	1	
7	E02 127 382	FUSE	F11	1	1	1	1	3.15A
8	E02 336 385	VARISTOR	NR11	1	1	1	1	
9	E02 518 452	ELECTRONIC CONTROL P.C. BOARD		1				AUTO RESTART Including receiver P.C. board
	E02 629 452	ELECTRONIC CONTROL P.C. BOARD			1			AUTO RESTART Including receiver P.C. board
	E02 519 452	ELECTRONIC CONTROL P.C. BOARD				1		AUTO RESTART Including receiver P.C. board
	E02 630 452	ELECTRONIC CONTROL P.C. BOARD					1	AUTO RESTART Including receiver P.C. board
10	E02 448 303	VANE MOTOR (VERTICAL)	MV2	1	1	1	1	
11	E02 408 034	VANE CRANK SET		1	1	1	1	HORIZONTAL
12	E02 409 040	VANE UPPER (WH)		1	1	1	1	
13	E02 408 303	VANE MOTOR (HORIZONTAL)	MV1	1	1	1	1	
14	E02 408 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	1	1	
15	E02 151 300	INDOOR FAN MOTOR	MF	1	1	1	1	RC4V19 - □□
16	E02 448 375	TERMINAL BLOCK	TB	1	1	1	1	3P
17	E02 151 505	FAN MOTOR RUBBER MOUNT		2	2	2	2	2PCS/SET
18	E02 448 307	INDOOR COIL THERMISTOR	RT12, RT13	1	1	1	1	
19	E02 448 034	VANE MOTOR SUPPORT SET		1	1	1	1	VERTICAL
20	E02 408 381	THERMAL FUSE	F12	1	1	1	1	93℃

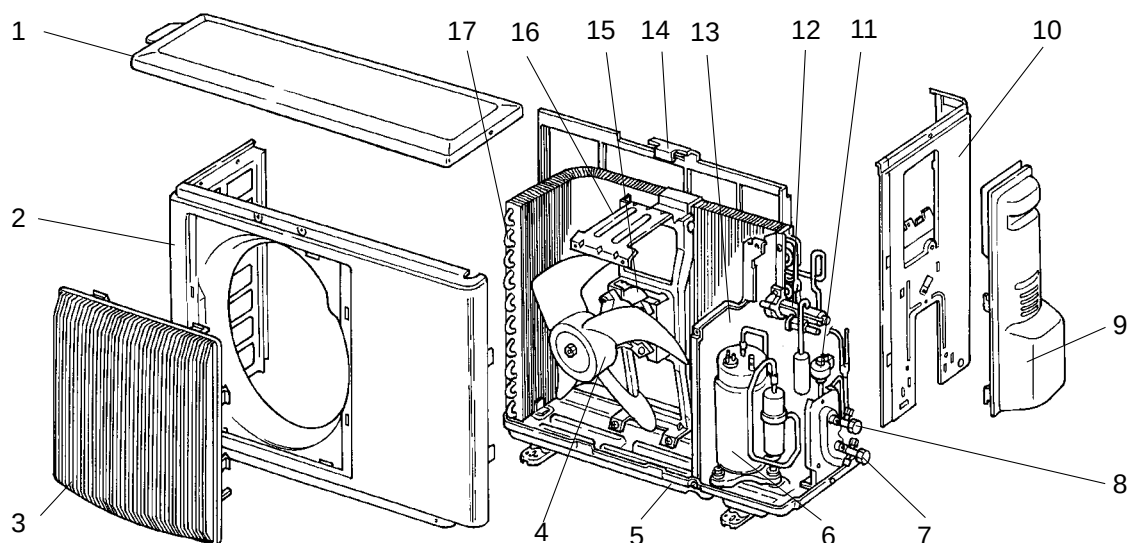
13-4. ACCESSORY AND REMOTE CONTROLLER

21	E02 448 426	REMOTE CONTROLLER		1		1		
	E02 629 426	REMOTE CONTROLLER			1		1	
22	E02 141 083	REMOTE CONTROLLER HOLDER		1		1		
	E02 527 083	REMOTE CONTROLLER HOLDER			1		1	

MUZ-G09SV -E1 MUZ-G12SV -E1

MUZ-G09SV -E2 MUZ-G12SV -E2

13-5. OUTDOOR UNIT STRUCTURAL PARTS AND FUNCTIONAL PARTS



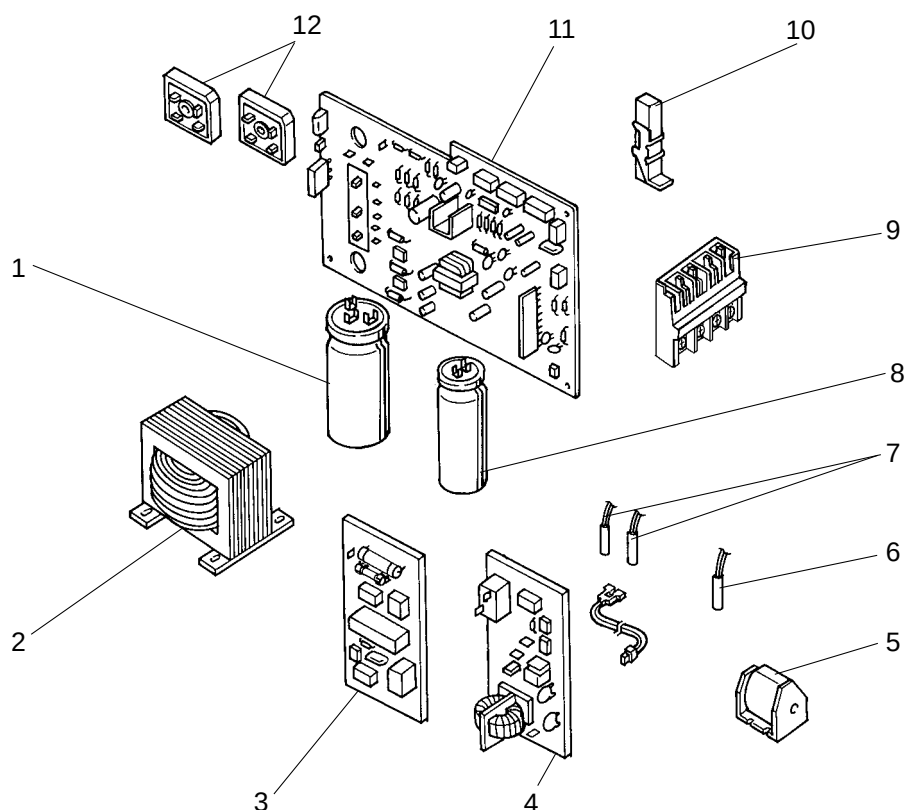
Part numbers that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MUZ-G09SV-		MUZ-G12SV-		
				E1	E2	E1	E2	
1	T2W E71 297	TOP PANEL		1	1			
	T2W E93 297	TOP PANEL				1	1	
2	T2W E45 232	FRONT PANEL		1	1	1	1	
3	T2W E56 521	GRILLE		1	1	1	1	
4	M21 47L 501	PROPELLER FAN		1	1			
	M21 21J 501	PROPELLER FAN				1	1	
5	M21 54A 290	BASE		1	1	1	1	
6	T92 518 272	COMPRESSOR	MC	1	1			KHV-104FGK
	T92 501 280	COMPRESSOR	MC			1	1	SHV-130FEA
7	M21 00A 661	STOP VALVE (GAS)		1	1			φ9.52
	M21 00L 661	STOP VALVE (GAS)				1	1	φ12.7
8	M21 21J 662	STOP VALVE (LIQUID)		1	1	1	1	φ6.35
9	M21 40L 245	SERVICE PANEL		1	1	1	1	
10	T2W E66 531	BACK PANEL		1				
	T2W E85 531	BACK PANEL			1			
	T2W E56 531	BACK PANEL				1		
	T2W E86 531	BACK PANEL					1	
11	T2W E66 645	EXPANSION VALVE		1	1			LEV, CAPILLARY TUBE
	M21 56T 645	EXPANSION VALVE				1	1	LEV ,CAPILLARY TUBE
12	M21 21J 961	4-WAY VALVE		1	1			
	T2W G04 961	4-WAY VALVE				1	1	
13	M21 HK6 293	SEPARATOR		1	1			
	M21 45G 293	SEPARATOR				1	1	
14	M21 83A 523	CONDENSER NET		1	1			
	M21 20A 523	CONDENSER NET				1	1	
15	T2W E66 301	OUTDOOR FAN MOTOR	MF61	1	1			RA6V18-□□
	T2W E68 301	OUTDOOR FAN MOTOR	MF61			1	1	RA6V28-□□
16	M21 47J 515	MOTOR SUPPORT		1	1			
	M21 50L 515	MOTOR SUPPORT				1	1	
17	M21 43G 630	OUTDOOR HEAT EXCHANGER		1	1			
	T2W E68 630	OUTDOOR HEAT EXCHANGER				1	1	
18	M21 LV0 936	CAPILLARY TUBE φ3.0×φ2.0×300				2	2	φ3.0×φ2.0×400
19	M21 00G 943	MUFFLER		1	1			
	M21 22A 943	MUFFLER				1	1	
20	T2W E66 943	MUFFLER SPECIAL		1	1			
	M21 00E 943	MUFFLER SPECIAL				1	1	

When servicing, cut the tube to the proper length as shown in the REFRIGERANT SYSTEM DIAGRAM. See page 21.

MUZ-G09SV -**E1** MUZ-G12SV -**E1**
 MUZ-G09SV -**E2** MUZ-G12SV -**E2**

13-6. OUTDOOR UNIT ELECTRICAL PARTS



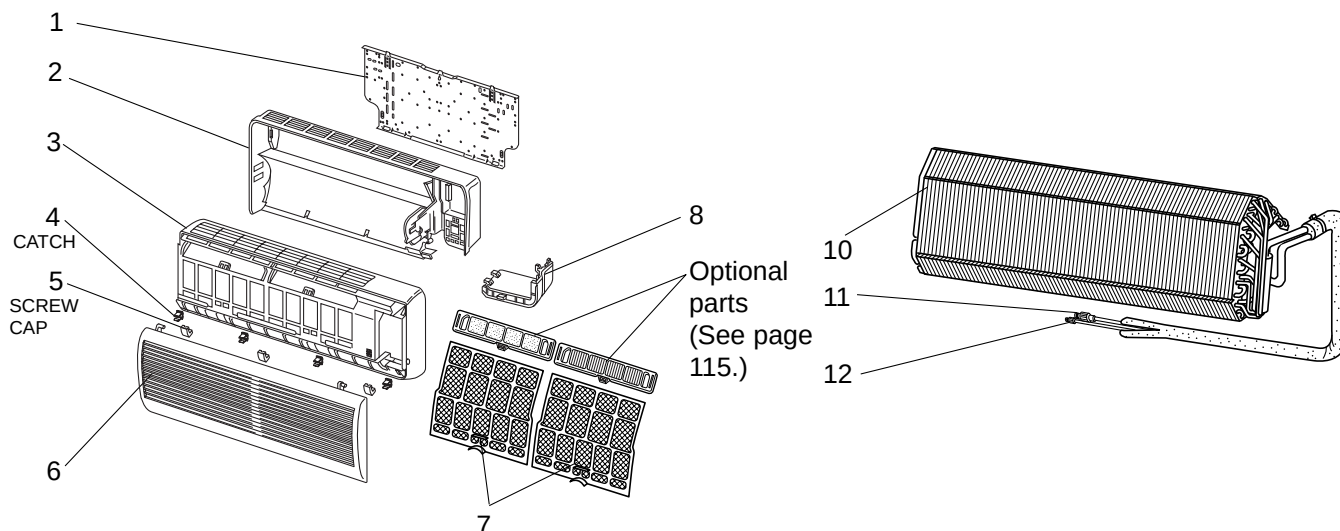
Part numbers that are circled are not shown in the illustration.

No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MUZ-G09SV-		MUZ-G12SV-		
				E1	E2	E1	E2	
1	T2W E66 357	SMOOTHING CAPACITOR	C63	1	1			1500 μ F/420V
	T2W E68 357	SMOOTHING CAPACITOR	C63			1	1	2500 μ F/420V
2	T2W E66 337	REACTOR	L61	1	1			
	M21 21A 337	REACTOR	L61			1	1	
3	T2W E66 441	RELAY P.C. BOARD		1	1	1	1	
4	T2W E66 424	NOISE FILTER P.C. BOARD		1	1			
	T2W E68 424	NOISE FILTER P.C. BOARD				1	1	
5	T2W E66 389	R.V. COIL	21S4	1	1	1	1	
6	M21 21L 307	FIN TEMPERATURE THERMISTOR	RT64	1	1	1	1	
7	M21 43A 307	THERMISTOR SET	RT61,62	1	1			
	M21 61A 307	THERMISTOR SET	RT61,62			1	1	
8	T2W E66 356	POWER-FACTOR CAPACITOR	C61	1	1			100 μ F/420V
	T2W E68 356	POWER-FACTOR CAPACITOR	C61			1	1	165 μ F/420V
9	T2W E45 376	TERMINAL BLOCK	TB2	1	1	1	1	4P
10	M21 00J 361	CURRENT-LIMITING RESISTOR	R64	1	1			10 Ω /20W
	M21 PG2 361	CURRENT-LIMITING RESISTOR	R64			1	1	
11	T2W E66 451	ELECTRONIC CONTROL P.C. BOARD		1	1			
	T2W E68 451	ELECTRONIC CONTROL P.C. BOARD				1	1	
12	T2W E45 447	DIODE STACK	DS61, DS62	2	2	2	2	
13	T2W A79 382	FUSE	F801	1	1	1	1	250V/2A
14	T2W E66 382	FUSE	F901	1	1	1	1	250V/1A

MSZ-G20SV -E1 (WH)

13-7. INDOOR UNIT STRUCTURAL PARTS

13-8. INDOOR UNIT HEAT EXCHANGER



13-7. INDOOR UNIT STRUCTURAL PARTS

Part number that is circled is not shown in the illustration.

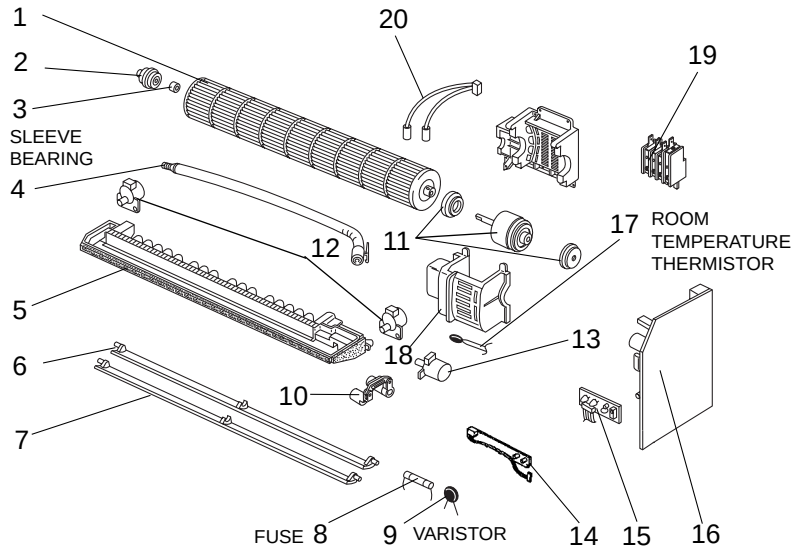
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MSZ-G20SV - E1 (WH)	
1	E02 527 970	INSTALLATION PLATE		1	
2	E02 527 234	BOX(WH)		1	
3	E02 527 000	FRONT PANEL ASSEMBLY(WH)		1	Including No.4,5,6
4	E02 408 142	CATCH		4	4PCS/ SET
5	E02 527 067	SCREW CAP(WH)		3	3PCS/ SET
6	E02 527 010	GRILLE(WH)		1	
7	E02 527 100	AIR FILTER		2	
8	E02 527 975	CORNER BOX RIGHT(WH)		1	
⑨	E02 528 007	LAMP PANEL		1	

13-8. INDOOR UNIT HEAT EXCHANGER

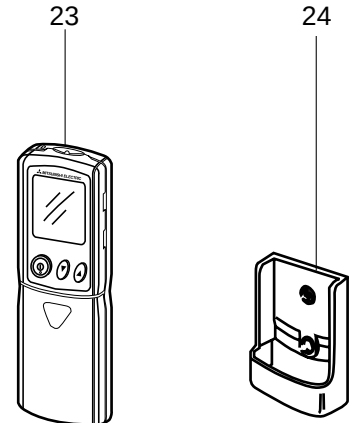
10	E02 527 620	INDOOR HEAT EXCHANGER		1	
11	E02 527 666	UNION (GAS)		1	φ15.88
12	E02 527 667	UNION (LIQUID)		1	φ9.52

MSZ-G20SV -E1 (WH)

13-9. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS



13-10. ACCESSORY AND REMOTE CONTROLLER



13-9. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS

Part numbers that are circled are not shown in the illustration.

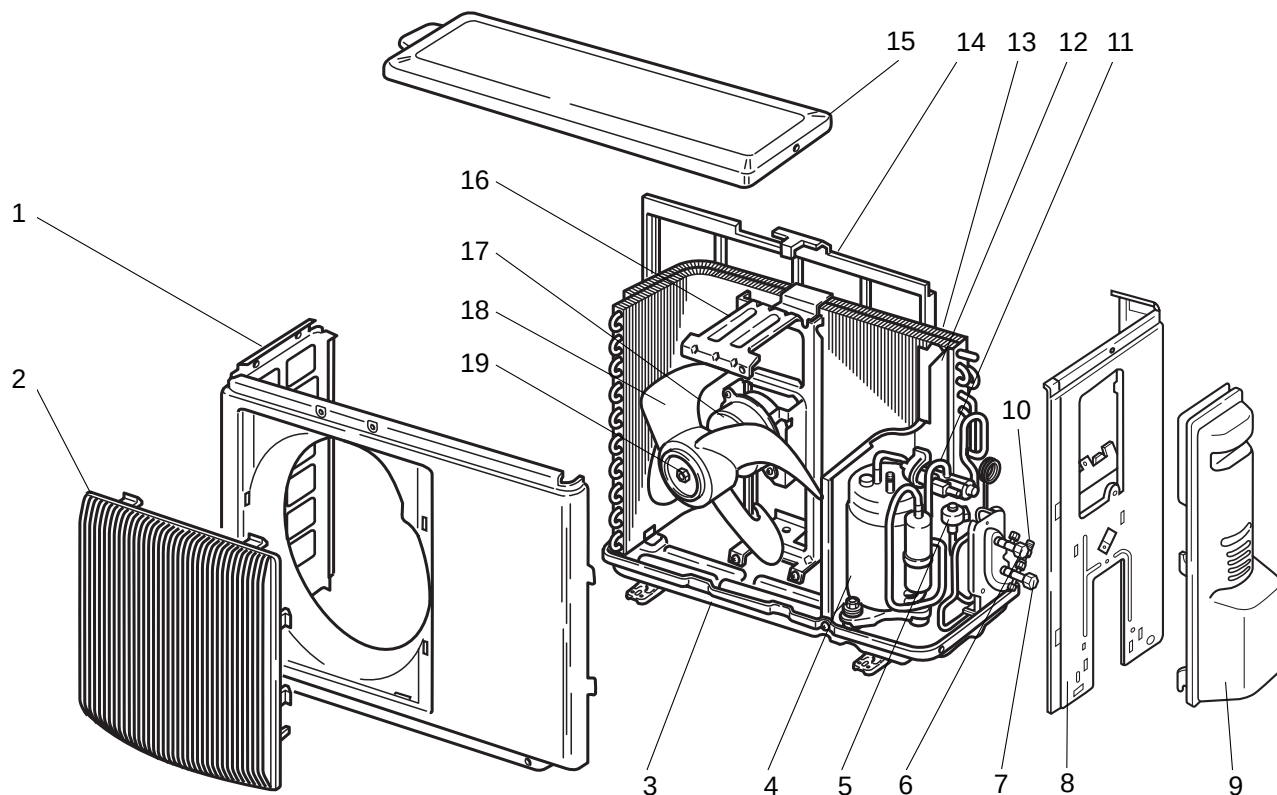
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MSZ-G20SV -E1 (WH)	
1	E02 527 302	LINE FLOW FAN		1	
2	E02 408 509	BEARING MOUNT		1	
3	E02 001 504	SLEEVE BEARING		1	
4	E02 408 702	DRAIN HOSE		1	
5	E02 527 235	NOZZLE ASSEMBLY(WH)		1	
6	E02 527 040	VANE UPPER(WH)		1	
7	E02 527 041	VANE LOWER(WH)		1	
8	E02 127 382	FUSE	F11	1	3.15A
9	E02 336 385	VARISOR	NR11	1	
10	E02 527 034	VANE CRANK SET		1	
11	E02 527 300	INDOOR FAN MOTOR ASSEMBLY	MF	1	RC4V40 -□□ Including RUBBER MOUNT
12	E02 448 303	VANE MOTOR (VERTICAL)	MV2	2	RIGHT & LEFT
13	E02 408 303	VANE MOTOR (HORIZONTAL)	MV1	1	UP & DOWN
14	E02 528 329	DISPLAY P.C. BOARD		1	
15	E02 527 468	RECEIVER P.C. BOARD		1	
16	E02 765 452	ELECTRONIC CONTROL P.C. BOARD		1	AUTO RESTART Including No.15
17	E02 527 308	ROOM TEMPERATURE THERMISTOR	RT11	1	
18	E02 527 333	MOTOR BAND		1	
19	E02 527 375	TERMINAL BLOCK	TB	1	4P
20	E02 527 307	INDOOR COIL THERMISTOR	RT12, RT13	1	
21	E02 528 034	VANE MOTOR SUPPORT SET (RIGHT)		1	
22	E02 529 034	VANE MOTOR SUPPORT SET (LEFT)		1	

13-10. ACCESSORY AND REMOTE CONTROLLER

23	E02 529 426	REMOTE CONTROLLER		1	
24	E02 527 083	REMOTE CONTROLLER HOLDER		1	

MUZ-G20SV -E1

13-11. OUTDOOR UNIT STRUCTURAL PARTS AND FUNCTIONAL PARTS



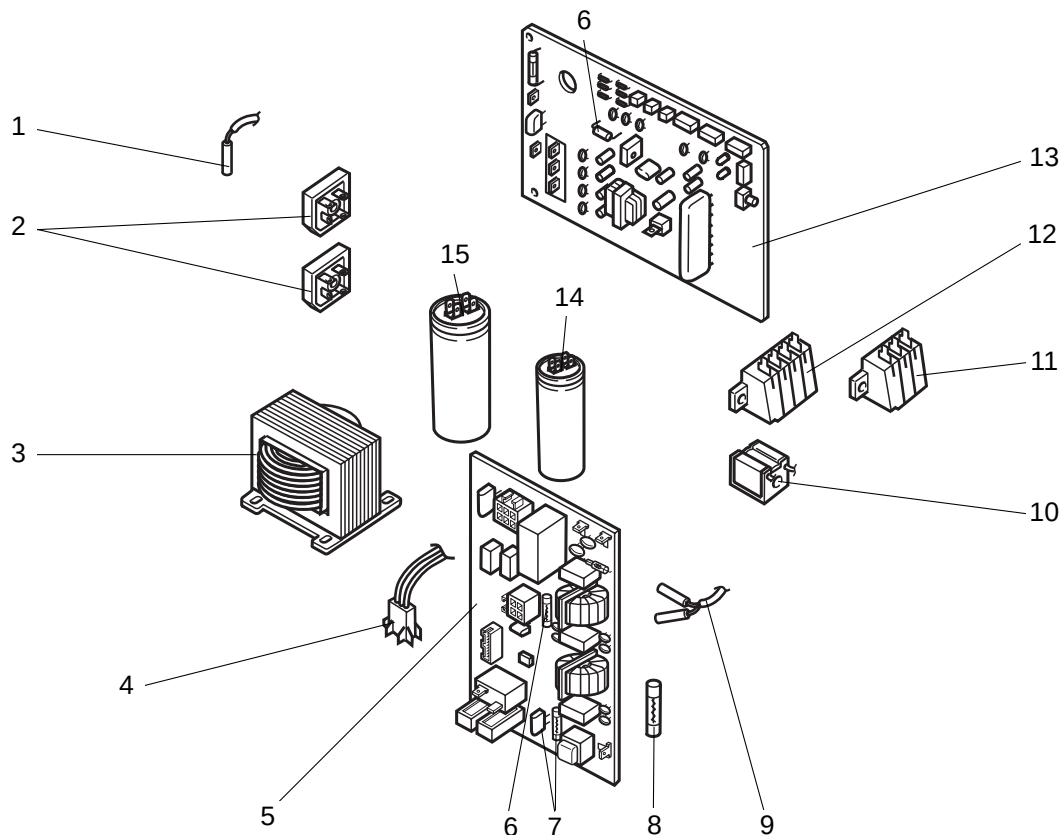
Part numbers that are circled are not shown in the illustration.

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / unit	Remarks
				MUZ-G20SV - E1	
1	T2W E87 232	FRONT PANEL ASSEMBLY		1	
2	T2W E87 521	GRILLE		1	
3	M21 68N 290	BASE ASSEMBLY		1	
4	T92 501 280	COMPRESSOR	MC	1	SHV-130FEA
5	T2W E87 646	EXPANSION VALVE		1	
6	M21 00A 661	STOP VALVE (LIQUID)		1	φ9.52
7	M21 00L 661	STOP VALVE (GAS)		1	φ15.88
8	T2W E99 531	BACK PANEL		1	
9	T2W E99 245	SERVICE PANEL ASSEMBLY		1	
10	T2W E99 659	DIFFERENT-DIAMETER PIPE		1	
11	M21 G69 642	4-WAY VALVE		1	
12	T2W E99 293	SEPARATOR		1	
13	T2W E99 630	OUTDOOR HEAT EXCHANGER		1	
14	M21 68K 523	CONDENSER NET		1	
15	M21 68N 297	TOP PANEL		1	
16	T2W E87 515	MOTOR SUPPORT		1	
17	T2W E87 301	OUTDOOR FAN MOTOR	MF61	1	RA6V35- □ □
18	M21 68N 501	PROPELLER FAN		1	
19	M21 61G 972	PROPELLER FAN NUT		1	
20	T2W E99 645	EXPANSION VALVE ASSEMBLY		1	EXPANSION VALVE, STRAINER, CAPILLARY TUBE φ3.0xφ2.0x200
21	T2W E99 651	EXPANSION VALVE COIL	LEV	1	
22	M21 PA2 642	STRAINER		2	
23	M21 LV0 936	CAPILLARY TUBE φ3.0xφ2.0x400		2	φ3.0xφ2.0x200
24	M21 986 936	CAPILLARY TUBE φ4.0xφ2.4x2,000		2	φ4.0xφ2.4x300

When servicing, cut the tube to the proper length as shown in the REFRIGERANT SYSTEM DIAGRAM. See page 22.

MUZ-G20SV - E1

13-12. OUTDOOR UNIT ELECTRICAL PARTS

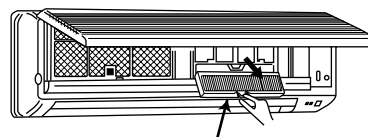


No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / unit	Remarks
				MUZ-G20SV - E1	
1	T2W E87 308	FIN TEMPERATURE THERMISTOR	RT67	1	
2	T2W E45 447	DIODE STACK	DS61, DS62	2	
3	M21 68K 337	REACTOR	L	1	
4	T2W E87 471	CONNECTOR POST ASSY		1	
5	T2W E87 424	NOISE FILTER P.C. BOARD		1	
6	T2W E66 382	FUSE (250V/1A)	F911,FUSE	2	
7	T2W E99 313	FUSE (250V/3.15A)	F912	1	FUSE AND VARISTOR SET
8	T2W E99 382	FUSE (250V/20A)	FUSE	1	
9	T2W E99 307	THERMISTOR SET	RT61, RT62	1	DISCHARGE, DEFROST
10	T2W E87 389	R.V. COIL	21S4	1	
11	T2W E64 376	TERMINAL BLOCK	TB1	1	
12	T2W E99 375	TERMINAL BLOCK	TB2	1	
13	T2W E99 451	ELECTRONIC CONTROL P.C. BOARD		1	
14	T2W E45 357	POWER-FACTOR CAPACITOR	C61	1	
15	T2W E75 356	SMOOTHING CAPACITOR	C62	1	

13-13. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 4 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

Model	Part No.
MSZ-G09SV - ☐ E1 MSZ-G12SV - ☐ E1	MAC-1300FT
MSZ-G09SV - ☐ E2 MSZ-G12SV - ☐ E2	



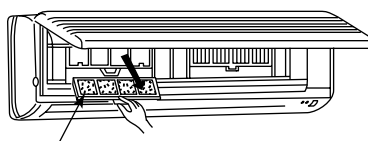
Air cleaning filter (White bellows type)

13-14. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odor of pets.
- Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
- For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
- When the filter color is still dark even after cleaning, replace the filter with a new one.

Replace the filter at least once a year.

Model	Part No.
MSZ-G09SV - ☐ E1 MSZ-G12SV - ☐ E1	MAC-1800DF
MSZ-G09SV - ☐ E2 MSZ-G12SV - ☐ E2	



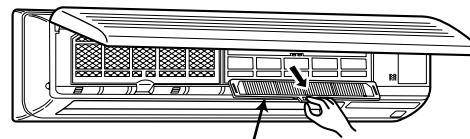
Deodorizing filter (Gray sponge type)

- DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.

14-1. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 4 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

Model	Part No.
MSZ-G20SV - E1	MAC-1700FT

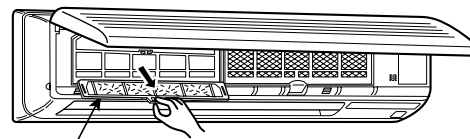


Air cleanig filter (White bellow type)

14-2. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odor of pets.
 - Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
 - For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
 - When the filter color is still dark even after cleaning, replace the filter with a new one.
- Replace the filter at least once a year.

Model	Part No.
MSZ-G20SV - E1	MAC-2200DF

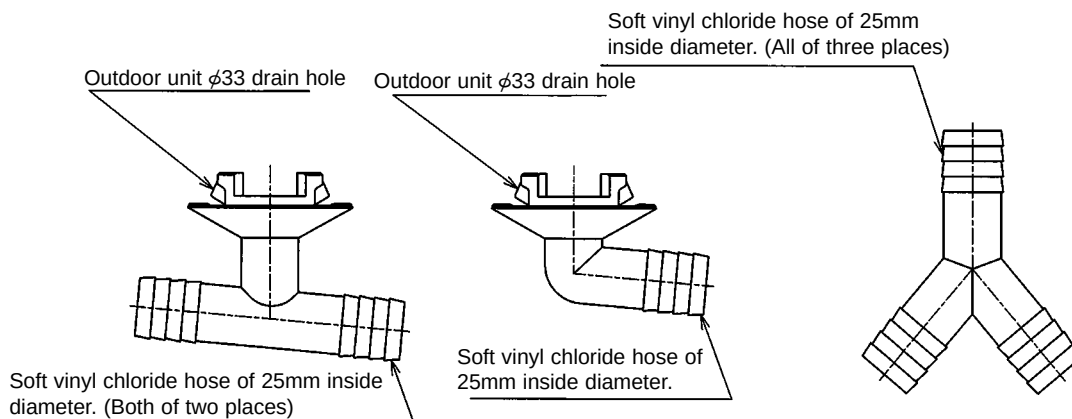


Deodorizing filter (Gray sponge type)

- DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.

14-3. Drain socket

Model	Part No.
MUZ-G20SV - E1	MAC-822DS-E





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